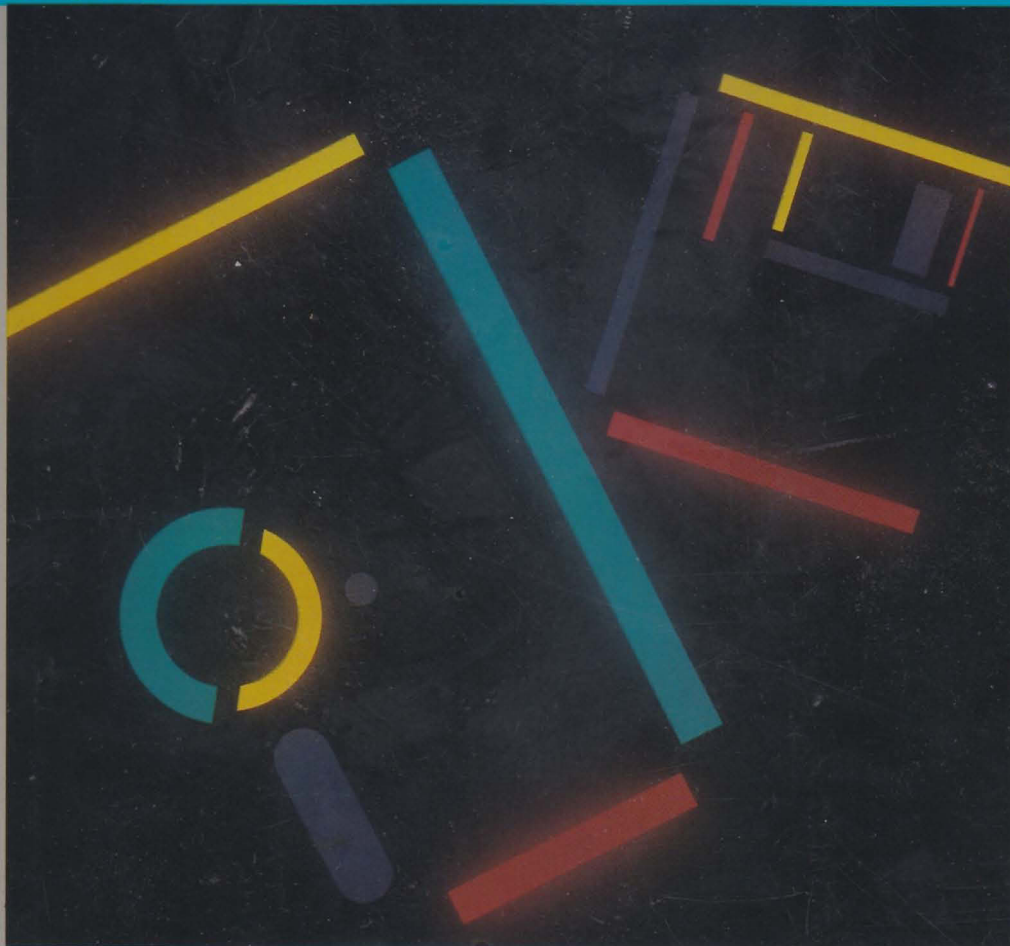# Disk Operating System Version 3.30

3.5" & 5.25" diskettes

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You may:

Software included:

Two 360KB, 5.25-inch diskettes
One 720KB, 3.5-inch diskette

System requirements:

IBM Display or equivalent

IBM Personal Computer, Personal
Computer XT™, PCjr™, Personal
Computer AT®, IBM PC Convertible,
IBM Personal System/2™ Model 30,
IBM Personal System/2 Model 50,
or IBM Personal System/2 Model 60

128KB of memory (minimum)

One 360KB, 5.25-inch diskette drive
(or one 1.2MB diskette drive for
Personal Computer AT), or one 720KB,
3.5-inch diskette drive

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Disk Operating System Version 3.30

Reference

Programming Family

IBM

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Disk Operating System Version 3.30

Reference

IBM

First Edition (April 1987)

About This Book

This manual explains how to use the IBM Personal
Computer Disk Operating System (DOS) version
3.30. Information is given on how to:

- Refer to DOS files

- Prepare your fixed disk for DOS

- Use directories to organize your disks

- Use redirection, piping, and filters with standard
  input and standard output

- Use DOS commands

- Create and edit files using the text Line Editor
  (EDLIN).

New and Experienced Users

Before using your DOS 3.30 diskette for the first
time, read the following sections of the chapters
indicated:

1. "Types of Diskettes and Drives" (Chapter 1)

2. "Using SELECT to Install DOS on a Fixed
   Disk" (Chapter 3)

Experienced Users

Experienced programmers can use this book together with the IBM *DOS Technical Reference* to develop application programs. Information is provided on:

- Installable device drivers

- Cursor control sequences that control cursor positioning and reassign keyboard keys

- File management

- DOS disk allocation

- DOS interrupts and function calls

- DOS control blocks and work area

- Commands that can be executed from within an application

- Fixed disk information

- EXE file structure and loading

- DOS memory management

- Code page switching.

The DEBUG and Linker chapters have been moved to the DOS *Technical Reference* book.

Terms Used

The terms "diskette," "fixed disk," and "disk" are used throughout this book. Where "diskette" is used, it applies only to diskette drives and diskettes. Where "fixed disk" is used, it applies only to the IBM nonremovable fixed disk drive. Where "disk" is used, it applies to both fixed disks and diskettes.

The terms "source" and "target" are used to describe diskettes and drives. The source refers to the original drive, and the target refers to the new drive.

The terms "local" and "remote" describe the location of a disk, directory or printer relative to your computer. A local disk, directory, or printer is on *your* computer. A remote disk, directory, or printer is on a *network* computer.

How This Book Is Organized

This book has 9 chapters and five appendices.

Chapter 1 introduces DOS version 3.30. It contains information about diskette types and compatibility. The new features of DOS version 3.30 are also discussed.

Chapter 2 describes the DOS file specification. Information on valid file name characters and global file name characters is described.

Chapter 3 describes detailed instructions on how to prepare your fixed disk for use by DOS.

Chapter 4 describes system configuration. It contains the commands that you can include in a CONFIG.SYS file to configure your system.

Chapter 5 describes the use of tree−structured directories.

Chapter 6 describes how to use redirection, piping, and DOS filters with standard input and standard output.

Chapter 7 describes the DOS commands and lists them in alphabetical order. The descriptions define the purpose, format, and type (internal or external) of each command. Examples are given where appropriate.

Chapter 8 describes how to use EDLIN, the line editor, to create, alter, and display source language files and text files.

Chapter 9 describes code page switching, how to use it, and how to install it on your system.

Appendix A explains general and device error messages and gives an appropriate response for each message.

Appendix B shows the country and keyboard codes.

Appendix C shows the code page tables.

Appendix D shows the allowable dead key combinations.

Appendix E shows a graphic layout (templates) of all the keyboards available to you. The templates allow you to convert your keyboard to match various languages.

Contents

Chapter 1. Introduction

About Your DOS Books and Diskettes

DOS version 3.30 comes with two books:

- *DOS User's Guide*

- *DOS Reference.*

DOS comes on:

- Two 5.25 inch, 360KB diskettes. The diskette labeled "DOS Start-Up Diskette" contains the DOS programs and commands needed to install and start the system. The diskette labeled "DOS Operating Diskette" contains the files needed for everyday use. Some commands are duplicated on both diskettes because they are needed to start the system and to perform everyday tasks.

- One 3.5 inch, 720KB diskette. This diskette is labeled "DOS Start-Up/Operating Diskette" and contains all the DOS programs, commands, and files needed for both installation and everyday use.

All three DOS diskettes are in a plastic pocket at the back of this book.

DOS 3.30: New and Enhanced

DOS 3.30 is the latest version of DOS containing some new features and commands. Many existing commands have been enhanced to provide more function.

New Commands

Four new commands have been added to DOS 3.30.

APPEND provides a DOS path-like support for data files in addition to program files.

FASTOPEN provides for fast access of files by holding in memory the locations of directories of recently opened files. FASTOPEN locates files by searching each directory in the path each time a file is accessed.

NLSFUNC allows you to select a code page (a complete character set). When used with DISPLAY.SYS and PRINTER.SYS, NLSFUNC allows support for extended country information and code page switching.

CHCP allows you to select and display the current code page.

Enhanced Commands

The following commands have been enhanced for DOS 3.30. Please refer to the command descriptions in Chapter 7 of this book for further details.

ATTRIB provides the ability to modify file attributes for single file, multiple files, selected files in a directory, or for all files at or below a directory level.

BACKUP allows a non-formatted diskette to be formatted, creates a log file, uses a faster and more efficient backup method, and backs up files based on a file time stamp.

Batch File commands allow you to suppress the ECHO OFF statement, reference the DOS environment values, and call a batch file from within a batch file without running a second copy of COMMAND.COM.

DATE sets the system date and permanent clock.

FDISK allows you to create multiple logical disk drives in a single large real disk.

GRAFTABL allows you to select several different country code pages and load them into memory.

KEYB allows additional keyboard layouts KEYB *xx* replaces KEYBxx).

MODE allows you to select the desired code page setup and additional communication devices.

RESTORE allows you to restore modified files on or before a given date and time or after a given date and time since the last BACKUP, or restores files that no longer exist on the target drive.

TIME sets the system time and permanent clock.

New Features

DOS 3.30 contains three new features.

DISPLAY.SYS allows you to specify code page switching on the EGA, IBM PC Convertible LCD, and IBM Personal System/2™ displays.

PRINTER.SYS allows you to specify code page switching on the IBM Proprinter Model 4201™ and the IBM Quietwriter III Printer Model 5202™ printers.

KEYBOARD.SYS provides information needed by the KEYB command.

Types of Diskette Drives

The following chart shows the types of diskette drives your IBM Personal Computer can have.

Size (inches)	Description	Capacity (bytes)
5.25	Single-sided	160KB/180KB
5.25	Double-sided	320KB/360KB
5.25	High-capacity	1.2MB
3.5	Double-sided	720KB
3.5	Double-sided	1.44MB

Types of Diskettes

The following chart shows the types of diskettes used to read and write information.

Size (inches)	Description	Capacity (bytes)
5.25	Single-sided, double-density	160KB/180KB
5.25	Double-sided, double-density	320KB/360KB
5.25	High-capacity, double-density	1.2MB
3.5	Double-sided	720KB
3.5	Double-sided	1.44MB

A single-sided, double-density diskette (160KB/180KB) contains 40 tracks, 8 or 9 sectors per track, and 512 bytes per sector.

A double-sided, double-density (320KB/360KB) diskette contains 40 tracks per side, 8 or 9 sectors per track, and 512 bytes per sector.

A high-capacity, double-density diskette (1.2MB) is a double-sided diskette that contains 80 tracks per side, 15 sectors per track, and 512 bytes per sector.

A double-sided diskette (720KB) contains 80 tracks per side, 9 sectors per track, and 512 bytes per sector.

A double-sided diskette (1.44MB) contains 80 tracks per side, 18 sectors per track, and 512 bytes per sector.

Diskette and Drive Compatibility

Some combinations of diskettes and drive types are not compatible for reading and writing. You need to consider diskette and drive compatibility when you use DOS commands that read and write to diskettes. This section describes which diskette and drive combinations *are* allowed.

Single-Sided Drives 160KB/180KB (5.25 inch)

You can read and write to:
160KB/180KB single-sided, double-density diskettes

Double-Sided Drives 320KB/360KB (5.25 inch)

You can read and write to:
160KB/180KB single-sided, double-density diskettes
320KB/360KB double-sided, double-density diskettes

1.2MB High-Capacity Drives (5.25 inch)

You can read and write to:
160KB/180KB single-sided, double-density diskettes*
320KB/360KB double-sided, double-density diskettes*
1.2MB high-capacity, double-density diskettes

* IMPORTANT: If you write on any of these diskette types using a high-capacity drive, you may not be able to read the diskettes in a single-sided or double-sided drive.

You need to consider diskette and drive compatibility when you use DOS commands that read and write to diskettes. For example, the FORMAT command contains a section called "FORMAT Compatibility." Read the section about compatibility before using the command.

720KB Double-Sided Drives (3.5 inch)

You can read and write to:

• 720KB double-sided diskettes

1.44MB Double-Sided Drives (3.5 inch)

You can read and write to:

• 720KB double-sided diskettes

• 1.44MB double-sided diskettes

Note:

* 720KB and 1.44MB diskettes cannot be inserted into a 160KB/180KB, 320KB/360KB, or a 1.2MB high-capacity drive.

About Messages

You may get messages on your screen when you use DOS commands. If you get a message and need help, refer to "Messages" in Appendix A for the *explanation* of the message and the *action* you should take.

Chapter 2. File Specification

FILE SPEC

Introduction

This chapter describes the file specification. It includes a description of the drive specifier, the file name, and the extension. It also contains information on the acceptable file name characters, reserved device names, and global file name characters.

The File Specification

The file specification tells DOS where to search for the specified file. A *filespec* consists of three parts: the drive specifier, the file name, and the file name extension. The following table describes each part of a filespec.

Parameters	Definition
d:	Denotes the drive specifier. It specifies the drive that contains the file you want to refer to. To specify the drive, type the drive letter followed by a colon. For example, A: is the drive specifier that represents drive A. If you omit the drive specifier, DOS assumes the file is located in the *default* drive. If a specific drive is not specified in the path, then the current drive is considered the default

Parameters	Definition
filename	Denotes the file name. The file name consists of one to eight characters. When you type a file name, DOS checks for invalid characters. The following characters are *invalid* in file names. . " / \ [ ] : ¦ < > + = ; , ASCII characters less than 21H Any other characters are valid.
.ext	Denotes the file name extension. The file name extension consists of a period followed by one to three characters. The following characters are *invalid* in a file name extension: . " / \ [ ] : ¦ < > + = ; , ASCII characters less than 21H Any other characters are valid.

DOS Device Names

Certain names have special meaning to DOS. They are called *DOS device names.* Since they are reserved, do not name files with a DOS device name. DOS reserves the following names:

Reserved Name	Device
CON	Console keyboard/screen. If you use CON as an input device, you can press the F6 key and then press Enter to generate an end − of − file indication that ends CON as an input device.
AUX or COM1	First Serial port.
COM2	Second Serial port.
COM3	Third Serial port.
COM4	Fourth Serial port.
LPT1 or PRN	First Parallel Printer (as an output device only).
LPT2	Second Parallel Printer
LPT3	Third Parallel Printer
NUL	Nonexistent (dummy) device for testing applications. If you use NUL as an input device, an immediate end-of-file is generated. As an output device, the write operations are simulated, but no data is actually written.

FILE SPEC

Notes:

1. Since these are reserved names, you cannot create files with these names.

2. When using a device name, you should ensure that the device actually exists. Using the name of a nonexistent device can cause unpredictable errors with DOS operations.

3. The reserved device names can be used in place of a file name in DOS commands.

4. The colon after the device name is optional. For example, you can type:

```
CON
```

```
 or
```

```
CON:
```

Global File Name Characters

DOS uses two special characters, **?** and *****, in a file specification. These special characters give you greater flexibility when using DOS commands. You can use the **?** and ***** when you refer to a file name and its extension.

The ? Character

A **?** in a file name or in a file name extension indicates that any character can occupy that position. For example,

```
del a:input.?
```

deletes all files with the file name INPUT and a one or no character extension on drive A. The following example:

```
A>dir  ab?de.xyz
```

lists all directory entries on the default drive with file names that have five characters, begin with AB, have any next character, are followed by DE, and have an extension of XYZ.

Here are some examples of the files that might be listed by the DIR command:

```
ABCDE    XYZ
ABIDE    XYZ
ABODE    XYZ
```

The * Character

An * in a file name or in a file name extension indicates that any character can occupy that position and all the remaining positions in the file name or extension. For example,

```
dir  ab*.xyz
```

lists all directory entries on the default drive with file names that begin with AB and have an extension of XYZ. In this case, the file names may be from 2 to 8 characters in length.

Here are some example files that might be listed by the DIR command:

```
ABCDE    XYZ
ABC357   XYZ
ABIDE    XYZ
ABIIOU   XYZ
ABO$$$   XYZ
AB       XYZ
```

Examples of Ways to Use ? and *

Example 1

To list the directory entries for all files named
INPUT on drive A (regardless of their file name
extension), type:

```
dir a:input.???
   or
dir a:input.*
```

Example 2

To list the directory entries for all files in the current
directory on drive A (regardless of their file names)
with a file name extension of XYZ, type:

```
dir a:????????.xyz
   or
dir a:*.xyz
```

Example 3

To list the directory entries for all files on drive A
with file names beginning with ABC and extensions
beginning with E, type:

```
dir a:abc?????.e??
   or
dir a:abc*.e*
```

Chapter 3. Preparing Your Fixed Disk

FIXED DISK

3-1

Introduction

If your IBM Personal Computer has a fixed disk, you must prepare the fixed disk before DOS can use it.

This chapter tells you how to:

- Refer to your computer's disk drives.

- Replace a previous version of DOS using REPLACE.

- Create a DOS partition using FDISK.

- Install DOS on the fixed disk using SELECT.

- Start DOS from your fixed disk.

FIXED DISK

Referring to Disk Drives

DOS assigns drive letters to the diskette drives and to the fixed disk in your computer.

For example, if your computer has one diskette drive and one fixed disk drive, DOS assigns the drive letters A and B to the diskette drive and the letter C to the fixed disk. If your computer has two diskette drives and two fixed disk drives, the diskette drives are A and B, and the fixed disks are C and D.

Replacing a Previous Version of DOS

Use the REPLACE command to replace previous
versions of DOS with DOS 3.30. For information
on the REPLACE command see Chapter 7.

1. Insert your DOS Start-Up Diskette into drive A.

2. Press the Ctl – Alt and Del keys to start DOS.

3. After entering the date and time, type the
    following and press Enter:

    ```
    sys c:
    ```

    This transfers the 3.30 System files to the fixed
    disk.

4. To replace existing DOS files on your fixed disk,
    type the following and press Enter:

    ```
    replace a:\*.*  c:\ /s /r
    ```

5. To add the new DOS 3.30 files, type the
    following and press Enter:

    ```
    replace a:\*.*  c:[path] /a
    ```

    Note: [path] is the path to the
    subdirectory that contains your DOS
    program files. This parameter is optional.

6. Remove your DOS Start-Up Diskette from drive A.

7. Insert the DOS Operating Diskette into drive A.

8. To replace existing DOS files on your fixed disk, type the following and press Enter:

```
replace a:\*.* c:\ /s /r
```

9. To add the new DOS 3.30 files, type the following and press Enter:

```
replace a:\*.* c:[path] /a
```

Network Information

When using the IBM PC Network program 1.00 or the IBM PC LAN program 1.10, make all files in the shared DOS directory read-only. To make these files read-only type the following and press Enter.

```
attrib +r c:[path]\*.*
```

Replace *path* with the path from the root to the desired directory. If the IBM PC Network or the IBM PC LAN Program Installation Aid was used to install the network, *path* will be "APPS\DOS."

FIXED DISK

Dividing Your Fixed Disk

A fixed disk can be divided into up to 4 sections
called partitions. A partition defines the area on a
fixed disk that belongs to a particular operating
system. It is possible to have more than one
operating system residing on a fixed disk at the same
time, although only one can be used at each time.
For example, DOS and IBM XENIX can both be
installed on the same fixed disk, and the portion of
the disk that belongs to each operating system is
called a partition. However, you can only use DOS,
or IBM XENIX, at any one time. You can not run
both at the same time.

An operating system can have more than one
partition that belongs to it. DOS has two partition
types. The first partition, and the only one that is
required to use DOS on a fixed disk, is called a
Primary DOS partition. This partition can be up to
32MB in size, and must exist in order to start DOS
from the fixed disk.

The other type of partition used by DOS is called an
extended DOS partition. This partition can be any
size, and can be subdivided into multiple areas called
logical drives. These logical drives can be any size
up to 32MB. You may want to create an extended
DOS partition and divide it into logical drives if your
disk is greater than 32MB in size. When you start
DOS, each logical drive will be assigned a drive letter
that you can use to access that drive, just like it was
a separate fixed disk. For example, if you have 1
fixed disk, and create a Primary DOS partition, an
extended DOS partition, and create 1 logical drive in
the extended DOS partition, DOS will assign the
drive letter C to the area of the disk defined by the
Primary DOS partition, and D to the area defined by
the logical drive. Depending on the amount of space
available in the extended DOS partition, you can
create logical drives up to drive letter Z.

FDISK allows you to create both a Primary and Extended partition on each fixed disk. It will also allow you to divide the extended DOS partition into logical drives. To create partitions for other operating systems, you need to refer to the installation procedures for that operating system.

> **Note:** All primary DOS partitions and extended DOS partitions must be formatted before they can be used. For additional information, see the FORMAT command in Chapter 7.

Using FDISK

With the FDISK program, you can create a DOS partition and do other fixed disk tasks.

FDISK allows you to:

- Create a Primary DOS or extended DOS partition

- Change an active partition

- Delete a DOS or extended DOS partition

- Display partition data

- Select the next fixed disk drive for partitioning if you have more than one.

FDISK has menus and screens that guide you through the tasks. To find out how to use FDISK, continue with "Starting FDISK."

Starting FDISK

To start FDISK, follow these steps:

1. With your DOS Start-Up Diskette in drive A, at the DOS prompt A > , type:

   `fdisk`

2. Press Enter.

   The FDISK Options menu appears.

```
IBM Personal Computer
Fixed Disk Setup Program Version 3.30
(C)Copyright IBM Corp. 1983,1987

FDISK Options

Current Fixed Disk Drive: 1

Choose one of the following:

     1.  Create DOS Partition
     2.  Change Active Partition
     3.  Delete DOS Partition
     4.  Display Partition Information
     5.  Select Next Fixed Disk Drive

 Enter choice: [1]


 Press ESC to return to DOS
```

Choose what you want to do. If you make a mistake or change your mind, press ESC to return to the FDISK Options menu. After making a selection, you see a series of screens.

Some options display a default choice value. If you want the default value as your choice, press Enter. If you want a different value than the default value, type the value you want, then press Enter.

Choices 1 through 4 appear if your computer has one fixed disk. Choice 5 appears if your computer has more than one fixed disk. When you see this menu, the "Enter choice" field displays a "1."

> **Note:** A warning prompt appears if at least one defined partition exists, but the partition is not marked active. This warning indicates that the disk will not boot.

3. Select one of the following:

- If you want to *create* a DOS partition, select Choice 1, "Create DOS Partition."

- If you want to *change* an active partition, select Choice 2, "Change Active Partition."

- If you want to *delete* a DOS partition, select Choice 3, "Delete DOS Partition."

- If you want to *display* information about the partitions on your fixed disk, select Choice 4, "Display Partition Information." .

- If you want to use FDISK on another fixed disk drive, select Choice 5, "Select Next Fixed Disk Drive."

Creating a DOS Partition (Choice 1)

Choice 1 (Creating a DOS partition) is the default value for the FDISK Options menu. To create a DOS partition, press Enter. The following screen is displayed:

```
Create DOS Partition

Current Fixed Disk Drive: 1

    1. Create Primary DOS partition
    2. Create Extended DOS partition


Enter choice: [1]

Press ESC to return to FDISK Options
```

Press Enter for the default choice 1, create primary DOS partition.

The following screen is displayed:

```
Create Primary DOS Partition

Current Fixed Disk Drive: 1


Do you wish to use the maximum size
for a DOS partition and make the DOS
partition active (Y/N)............? [Y]

Press ESC to return to FDISK Options
```

If you intend to use part of the fixed disk for another operating system, follow the instructions for "Using Part of a Fixed Disk for DOS."

If you want to use the largest available space up to 32MB for your primary DOS partition, and you want DOS to start from the fixed disk, press Enter.

The following message is displayed if you press enter.

```
System will now restart

Insert DOS diskette in drive A:
Press any key when ready . . .
```

DOS restarts and prompts you to enter the date and time. Enter the date and the time. The DOS Start-Up Diskette should be in drive A.

When the DOS prompt is displayed, the DOS partition has been created. Before you can use the DOS partition, you must format the disk. Go to the "Installing DOS on the Fixed Disk" section in this chapter.

FIXED DISK

Using Part of a Fixed Disk for DOS

If you do not want to use the largest available space, choose N and press Enter, the following message displays:

```
Create Primary DOS Partition

Current Fixed Disk Drive: 1


No partition defined


Total disk space is  305 cylinders.
Maximum space available for partition
is  305 cylinders.

Enter partition size............: [ 305]

Press ESC to return to FDISK options
```

"Total disk space" indicates how many cylinders are on your entire disk. "Maximum space available" indicates how many cylinders remain to partition. If you want your DOS partition to use all the available space, press Enter. If you do not want to use all the available space for DOS, type the size you want to use (in cylinders), and press Enter.

> **Note:** This option will not set the DOS partition as active, where the previous screen will. See the section, "Changing the Active Partition."

The DOS partition is created, but before you can start from it, you must:

1. Change the active partition (FDISK Options menu Choice 2).

2. Press ESC to return to DOS from the FDISK Options menu.

3. Install DOS on the Fixed Disk (refer to "Installing DOS on the Fixed Disk" later in this chapter).

FIXED DISK

Changing the Active Partition (Choice 2)

Your fixed disk can have four primary partitions, but only one partition can be *active*. The active partition has control of your computer when started from the fixed disk. You can have an active partition only on the first fixed disk.

If you type **2** on the FDISK Options menu, a screen like the one shown here appears. This sample screen shows the partition status of a fixed disk that has two partitions.

```
Change Active Partition

Current Fixed Disk Drive: 1

Partition Status   Type   Start End Size
C:  1        A      DOS    000  149 150
    2               EXT DOS 150  304 155



Total disk space is  305  cylinders

Enter the number of the partition you
want to make active...............: [ ]
```

Partition   The number assigned to the partition
                  and any drive letters assigned to a DOS
                  partition.

Status   The status of the partition—A for active.

Type   The kind of partition—DOS or EXT
                  DOS.

Start/End   The starting and ending cylinder
                  numbers of the partition.

Size   The number of cylinders the partition
                  uses.

To select an active partition, do the following:

1. Type the number of the partition that you want
   to be active. (If you want your DOS partition to
   be active, type the number for the DOS
   partition.)

2. Press Enter. The partition you selected then
   becomes the active partition.

3. Go to "Using SELECT to Install DOS on a
   Fixed Disk."

   Note: To have a startable [C:] drive you need
   an active partition. An extended DOS partition
   cannot be marked as active.

FIXED DISK

Deleting a DOS Partition (Choice 3)

You can delete the fixed disk partition you use for
DOS. When you do, remember any data in that
partition is also deleted and cannot be recovered.
The boundaries for that partition are also removed.

Note: If you delete the DOS partition but
want to continue using DOS, insert a DOS
diskette in drive A and start DOS again.

1. If you typed **3** on the FDISK Options menu, you
see a screen like the one shown here.

```
Delete DOS Partition

Current Fixed Disk Drive: 1

Choose one of the following:


    1.  Delete Primary DOS partition
    2.  Delete Extended DOS partition


Enter choice: [ ]


Press ESC to return to FDISK Options
```

When the screen is displayed, select one of the
following options, and press Enter.

If you choose option **1**, the following screen is
displayed:

```
Delete Primary DOS Partition

Current Fixed Disk Drive: 1


Partition Status  Type   Start End Size
C:   1       A       DOS     000  304  305


Warning! Data in the DOS
partition will be lost.  Do you wish
to continue........................? [N]


Press ESC to return to FDISK Options
```

When the screen first appears, you see an **N** (no) next to the prompt "Do you wish to continue?"

2. Select one of the following:

- If you do not want to delete the DOS partition, press Enter to return to the FDISK Options menu.

- If you want to delete the DOS partition, type **Y** (yes) and press Enter.

Displaying Partition Information (Choice 4)

You can display information showing how a fixed disk is partitioned.

If you selected option **4** on the FDISK Options menu, a screen similar to this one displays:

```
Display Partition Information

Current Fixed Disk Drive: 1


Partition Status   Type    Start End Size
C:  1         A     DOS      000 199 200
    2               EXT DOS  200 304 105



Total disk space is 305 cylinders

Press ESC to return to FDISK Options
```

Select the Next Fixed Disk Drive (Choice 5)

If your computer has more than one fixed disk attached, you can use the same FDISK menu options for each one. If you type **5** on the FDISK Options menu, you can prepare another fixed disk.

Installing DOS on the Fixed Disk

After creating your DOS partition, use the SELECT command to format the DOS partition, and install DOS on the fixed disk. The SELECT command tells DOS information about your keyboard type, the date and time format you want to use. You must make these two selections before you start using DOS from your fixed disk.

The *keyboard code* tells DOS which keyboard layout you want to use. For example, if you are using a U.S. keyboard, specify the keyboard code US.

FIXED DISK

The *country code* tells DOS the date and time format. It also tells DOS the currency symbol, and the decimal separator for the country you choose. For example, if you choose the US country code (001):

- The date format is MM/DD/YY (month/day/year)

- The time format is HH:MM:SS (hours:minutes:seconds)

- The currency symbol is $ (dollars)

- The decimal separator is . (period)

The table in Appendix B helps you choose the country code and keyboard code to use when you use the SELECT command.

Country and Keyboard Codes

Choose the country and keyboard codes for the SELECT command from the Country Codes table (see Appendix B).

Using SELECT to Install DOS on a Fixed Disk

Use the SELECT command to:

- Tell DOS which keyboard layout you want to use.

- Tell DOS which country code you want to use.

- Format your DOS partition.

- Copy DOS files to your fixed disk.

    Note: If the DOS you are using does not match your keyboard layout, you may experience difficulty in typing certain characters. These characters may include the colon (:), the backslash (\), and the letter "y." See Appendix B, "Special Keyboard Considerations," in the DOS *User's Guide*, to resolve these difficulties.

Warning: During the SELECT procedure, the DOS partition is formatted. Do not use SELECT if you have a previous version of DOS or other information on your fixed disk.

To replace a previous version of DOS, see "Replacing a Previous Version of DOS" in this chapter.

    Note: If your DOS partition is larger than 10MB and is formatted with DOS Version 3.30, you cannot use versions of DOS prior to DOS 3.00 to access your fixed disk.

FIXED DISK

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1. Type the SELECT command with the drive
   specifier of your fixed disk, the country code, and
   the keyboard code that you chose from the table
   in Appendix B. In the example below, *d*:
   specifies the target drive, *path* specifies the
   directory location on the drive, *xxx* stands for
   the country code, and *yy* stands for keyboard
   code. At the A >, type:

   ```
   select d:[path] xxx yy
   ```

2. Press Enter. The following message displays:

   ```
   SELECT is used to install DOS the first
   time.  SELECT erases everything on the
   specified target and then installs DOS.
   Do you want to continue (Y/N)?  Y
   ```

3. Press Enter to start the SELECT procedure. The
   following message displays:

   ```
   WARNING, ALL DATA ON NON-REMOVABLE DISK
   DRIVE d: WILL BE LOST!
   Proceed with Format (Y/N)?
   ```

4. Type **Y** and press Enter to proceed with
   formatting. As the fixed disk is being formatted,
   a message is displayed showing you the head and
   cylinder numbers. They keep changing as the
   formatting procedure progresses.

   Then the following message is displayed:

   ```
   Format complete
   System transferred

   Volume label (11 characters, ENTER for none)?
   ```

   The Volume label may be entered at this time.
   The Volume label is used to identify the fixed
   disk. If you want to label your fixed disk, type a
   name of up to 11 characters (for example,
   MYFIXEDDISK) and press Enter. If no label
   is desired, only press Enter. The following disk
   statistics are displayed:

```
xxxxxx bytes total disk space
 xxxxx bytes used by system
 xxxxx bytes in bad sectors
xxxxxx bytes available on disk
```

Reading source file(s)...

The names of the DOS files appear on the screen as they are copied to your fixed disk.

When the DOS prompt A > returns, the SELECT procedure is complete.

For more information about SELECT, see Chapter 7.

FIXED DISK

Starting DOS from Your Fixed Disk

Starting DOS from your fixed disk means switching your computer on or doing a system reset (restart DOS), to load DOS from the DOS partition. DOS can be loaded only from the first fixed disk drive attached to your computer.

1. To start DOS from a fixed disk, be sure to:

   • Leave the drive door for drive A open when you switch on the power or perform a system reset.

   • Place a copy of the operating system files in the DOS partition.

   • Make the primary DOS partition the active partition.

2. Do one of the following:

   • If your computer is off, switch on your computer.

   • If your computer is on, press Ctrl – Alt – Del (system reset).

   After you have set up your fixed disk, you may want to refer to Chapter 5, "Using Tree – Structured Directories," for information on how to organize your files.

Chapter 4. Configuring Your System

CONFIGURING

Introduction

This chapter describes how to configure your system by creating a file named CONFIG.SYS. A list of the configuration commands is given with a description of the purpose and format of the command. You can use configuration commands to:

- Set extended checking of Ctrl – Break (BREAK)

- Specify the number of disk buffers (BUFFERS)

- Specify the country whose date and time format you want to use (COUNTRY)

- Install device drivers (DEVICE)

- Specify the number of files that can be opened by file control blocks (FCBS)

- Specify the number of files that can be open at one time (FILES)

- Set the maximum drive letter that you may access (LASTDRIVE)

- Specify the name of a top – level command processor (SHELL)

- Override the default stack resources (STACKS)

CONFIGURING

What is a Configuration File?

A configuration file contains a list of commands that set up your system. Each time you start, DOS searches the root directory of the drive it was started from for the file named CONFIG.SYS. If the file CONFIG.SYS is found, DOS reads the file and interprets the commands within the file. If the file CONFIG.SYS is not found, DOS assigns default values for the configuration commands.

Create a configuration file named CONFIG.SYS to change the default values of the configuration commands. If you add or change any of the configuration file commands, the changes are not in effect until the *next* time you start DOS.

Creating a CONFIG.SYS File

Create a CONFIG.SYS file using an editor (such as EDLIN, refer to chapter 8 in this book) or the DOS COPY command. This section describes how to create a CONFIG.SYS file using the COPY command directly from the standard input device.

> **Note:** If you have used the SELECT command, a CONFIG.SYS file has already been created that includes the the COUNTRY configuration command. You should use EDLIN or an editor to add other configuration commands.

Follow these steps to create a CONFIG.SYS file using the COPY command.

1. At the DOS prompt A >, type:

   ```
   copy con config.sys
   ```

2. Press Enter.

3. Type the configuration commands (see "Configuration Commands") you want in the CONFIG.SYS file. Press Enter after you type each command.

4. When you have finished typing the commands, press the F6 key and then Enter. This ends the COPY CON command and saves the file.

Now a file named CONFIG.SYS has been created. But the values for the commands are not in effect until the *next* time you start DOS.

Configuration Commands

The following section describes the commands that you can include in a CONFIG.SYS file.

BREAK
Command

Purpose:

Allows you to instruct DOS to check for Ctrl-Break whenever a program requests DOS to perform any functions.

Format:

BREAK = [ON | OFF]

Remark:

The default value is set at BREAK = OFF. This means that DOS checks for Ctrl – Break being entered only during:

- Standard output operations

- Standard input operations

- Standard print operations

- Standard auxiliary operations.

If you want DOS to check for Ctrl – Break whenever it is requested, set BREAK = ON. This allows you to *break out* of a program that produces few or no standard device operations (such as a compiler). For instance, if a program is being compiled, it is important to have a way to stop compilation if an error or loop is encountered.

Purpose:

Allows you to determine the number of disk buffers that DOS will allocate in memory when it starts.

Format:

BUFFERS = x

Remark:

x is the number of disk buffers (1-99) DOS allocates in memory when it starts. This value remains in effect until DOS is restarted with a different value specified in the configuration file. If BUFFERS= is not specified, the default is determined as follows:

1. Buffers=2

2. If any diskette drive is greater than 360KB, BUFFERS=3

3. If memory size is greater than 128KB, BUFFERS=5

4. If memory size is greater than 256KB, BUFFERS=10

5. If memory size is greater than 512KB, BUFFERS=15

   Note: If your system has enough memory to cause BUFFERS= to be greater than 2, you can set BUFFERS=2 in the CONFIG.SYS file to reduce the amount of memory used by DOS.

CONFIGURING

BUFFERS
Command

What Is a Buffer ?

A disk buffer is a block of memory that DOS uses to
store data being read from or written to a disk. For
example, if an application reads a 128 – byte record
from a file, DOS reads the entire sector into one of
its buffers, locates the correct 128 – byte record in the
buffer, and moves the record from the buffer into the
application's area of memory. It then marks that
buffer as having been used recently. On the next
request to transfer data, DOS attempts to use a
different buffer. In this way, all of the buffers
eventually contain the most recently used data. The
more buffers DOS has, the more data is in memory.

Read/Write Requests

Before DOS reads or writes a record that is not an
exact multiple of the sector size, it checks to see if
the sector containing that record is already in a
buffer. If not, it must read the sector as described
above. But if the data is already in a buffer, DOS
can simply transfer the record to the application's
area without reading the sector from the disk. This
saves time, both in reading and writing records,
because DOS must first read a sector before it can
insert a record that your application is attempting to
write.

Random/Sequential Applications

For applications that read and write records in a random fashion (such as many BASIC and data base applications), the likelihood of finding the correct record already in a buffer increases if DOS has more buffers to work with. This can increase performance of those applications by speeding up the access time.

For applications doing sequential reads and writes (read an entire file, write an entire file), however, there is little advantage to having a large number of buffers allocated.

Because all applications are different, there is no specific number of buffers that will serve all applications equally well. If your applications do little random reading and writing of records, the system default should be sufficient.

CONFIGURING

BUFFERS
Command

However, if you use data base type applications, or run programs that perform a lot of random reads and writes of records, you will want to increase the number of DOS buffers. The "best" number of buffers for your particular application can be determined only by using different values until the desired performance is achieved. For most data base applications, a value between 10 and 20 buffers usually provides the best results. For subdirectories, between 10 and 25 buffers usually provides desirable performance.

Beyond that point, the system may appear to start running slower. With a very large number of buffers, it can take DOS longer to search all the buffers for a record than it would take to read the record from disk.

Size of Your Computer

The final consideration in determining the number of buffers to allocate is the memory size of your computer. Since each additional buffer increases the resident size of DOS by 528 bytes, the amount of memory available to the application is reduced by that amount. Additional buffers may actually cause some applications to run more slowly because there is less memory available for the application to keep data. This could result in more frequent reads and writes than would otherwise be necessary.

In summary, the optimum number of buffers must be determined by *you*, based on:

- The types of applications most often used

- The memory size of your computer

- Your analysis of system performance when using your applications with different numbers of buffers allocated.

  Note: For computers with fixed disks, high capacity drives, or both, a minimum of BUFFERS = 3 is recommended.

CONFIGURING

COUNTRY
Command

Purpose:

Use to specify the date, time, collating sequence, capitalization, and folding format for a given country. Other information, such as the currency symbol and the decimal separator for a particular country, is also set using the COUNTRY command.

> **Note:** COUNTRY does not translate the text of DOS messages for the country you specify.

Format:

COUNTRY = *xxx,[yyy]*,[*d:*]*filename*[*.ext*]

or

COUNTRY = *xxx,[yyy]*

Remark:

xxx is the 3 – digit international country code for the telephone system. The countries listed (see Appendix B) are supported for DOS Version 3.30. If your country is not listed, choose the most similar country supported.

yyy is the code page of the desired country information. A single country may have different information based on the selected code page. Each country has two code pages. *yyy* specifies which of the two to use. The default for the code page is country dependent. Refer to Appendix C in this book, to select a specific code page.

[*d:*]*filename*[*.ext*] specifies the COUNTRY information file.

The normal name of this file is COUNTRY.SYS, but you may choose to call it another name. It is highly recommended that you provide a complete path to this file. See the following example:

```
c:\dos\country.sys
```

> **Note:** If no COUNTRY= statement is in the CONFIG.SYS file the default country code is 001, the default code page is 437 and the default country information file is \COUNTRY.SYS.

Examples:

To specify the date and time format for the United States, include the following command in the CONFIG.SYS file:

```
country=001 437 c:\country.sys
```

The next time you start DOS, the date format is *mm-dd-yy*, the time format is *hh:mm:ss*, the decimal separator is a period (.), and the currency symbol is $.

This example assumes that the file COUNTRY.SYS is installed in the root directory of the C: drive.

You can omit the code page in your COUNTRY command such as:

```
country=001,,c:\country.sys
```

the system will use the default code page for the country. For the above example, the code page 437 would be used.

CONFIGURING

COUNTRY
Command

You also can omit the country information file such as:

```
country=001
```

the system assumes COUNTRY.SYS file exists in the root directory of the current drive.

DEVICE
Command

Purpose:

Allows you to specify the name of a file containing a device driver.

Format:

DEVICE = [*d*:][*path*]*filename*[.*ext*]

Remark:

During startup, DOS loads the file into memory and gives it control as described in "Installation of Device Drivers" in Chapter 2 of *DOS Technical Reference*. Please refer to that section for technical information about installable device drivers.

Loading Standard Device Drivers

The standard device drivers loaded by DOS support the standard input, standard output, standard printer, diskette, and fixed disk devices. A clock driver is also loaded (see Chapter 2 of the *DOS Technical Reference*). You don't need to specify any DEVICE= commands for DOS to support these devices.

Installing Your Own Device Driver

Programmers and developers of additional device drivers should:

- Include a DEVICE= command in the CONFIG.SYS file for each driver to be loaded.

CONFIGURING

DEVICE
Command

When using the DEVICE command, DO NOT use
the following example:

```
device=\keyboard.sys
device=country.sys
```

Device Drivers on Your DOS Diskette

Five device drivers are included on your DOS
diskette:

- ANSI.SYS - an enhanced standard input and
  standard output device driver

- DISPLAY.SYS - a display driver to provide code
  page switching support for CON

- DRIVER.SYS - a block device driver

- PRINTER.SYS - a printer driver to provide code
  page switching support for PRN, LPT1, LPT2,
  and LPT3

- VDISK.SYS - a virtual disk device driver.

You must include a DEVICE= command in the
CONFIG.SYS file for these device drivers before you
can use them.

ANSI.SYS

To use the "Extended Screen and Keyboard Control" features described in the *DOS Technical Reference*, create the file CONFIG.SYS on the disk you start DOS from. The file should include the command DEVICE = ANSI.SYS. This command causes DOS to replace the standard input and standard output support with the extended functions.

CONFIGURING

DEVICE
Command
DISPLAY.SYS

Purpose:

Allows you to use code page switching on the IBM PC Convertible LCD screen, EGA, and IBM Personal System/2 displays.

> **Note:** The U.S. user normally does not need to use DISPLAY.SYS. To determine if you need to use this device driver, refer to Chapter 9, "Code Page Switching."

> If you are using ANSI.SYS with DISPLAY.SYS, the DEVICE = ANSI.SYS statement must appear before the DEVICE = DISPLAY.SYS statement in the CONFIG.SYS file.

Format:

DEVICE = [*d:*][*path*]DISPLAY.SYS CON[:] = (*type*[,[*hwcp*][,*n*]])

or

DEVICE = [*d:*][*path*]DISPLAY.SYS CON[:] = (*type*[,[*hwcp*][,(*n,m*)]])

Remark:

type specifies the display adapter type. The display types are MONO, CGA, EGA, and LCD.

> **Note:** The display type EGA supports the Enhanced Graphics Adapter and IBM Personal System/2. The IBM Personal System/2 video support is not functionally equivalent to EGA video support.

hwcp specifies the code page supported directly by the hardware. The possible *hwcp* values are 437, 850,

860, 863, and 865. Refer to Appendix C for a description of these code pages.

n specifies the number of additional codes that can be supported. This value is referred to as the number of prepared code pages. The allowable range of additional code pages *n* must be between 0 and 12. Refer to the table on the following page for the default values of *n*.

> **Note:** The MONO and CGA cannot support prepared code pages. The value of *n* must be 0.

Each prepared code page requires a buffer in DISPLAY.SYS which hold the corresponding character fonts.

m specifies the number of sub-fonts supported for each code page. These sub-fonts vary for different adapters and display modes. If the value of *m* is not specified then the default is the maximum number of sub-fonts:

Devices	Font size	Default m
EGA	8 x 8 8 x 14	2
IBM Personal System/2 Displays	8 x 8 8 x 16	2
IBM PC Convertible LCD	8 x 8	1

CONFIGURING

DEVICE
Command

The following table is a compiled list of parameters for DISPLAY.SYS:

Type	Actual Device	Default n	n	m	Default m
CGA	•Color Graphics Adapter	0	0	0	0
MONO	•Monochrome/Printer Adapter	0	0	0	0
EGA	•Enhanced Graphics Adapter	1	1-12	1-2	2
	•IBM Personal System/2	1	1-12	1-2	2
LCD	IBM PC Convertible	1	1-12	1	1

The number of additional code page values may cause a buffer to be used to hold the image data. The size of this buffer is dependent on the display type. For example:

```
device=c:\dos\display.sys con:=(ega,437,2)
```

installs the code page switching support for the CON: device. It also tells the CON: driver that the display is an Enhanced Graphics Adapter with the 437 code page built in. The CON driver holds up to two code pages prepared by the use of the MODE command. See the MODE command, in Chapter 7 for additional information.

For additional information, refer to the NLSFUNC command in chapter 7 in this book.

DRIVER.SYS

Purpose:

Allows you to access and to use a disk device by referencing a logical drive letter.

Format:

DEVICE = DRIVER.SYS /D:*ddd* [/T:*ttt*][/S:*ss*] [/H:*hh*][/C][/N][/F:*f*]

Remark:

/D:*ddd* specifies the physical drive number. A physical drive has the value 0 through 255. A value of 0 specifies the first physical diskette drive and is referenced as drive A from the DOS command line.

The value 1 specifies the second physical diskette drive.

The value 2 indicates the third physical diskette drive (which must be external).

To specify the first physical fixed disk drive, use the value 128. The value 129 specifies the second physical fixed disk drive.

/T:*ttt* specifies the number of tracks per side (1-999). The default is 80 tracks per side.

/S:*ss* specifies the number of sectors per track (1-99). The default is 9 sectors per track.

/H:*hh* is the maximum number of heads (1-99). The default number is 2 heads.

/C specifies that changeline support is required. This is meaningful only on machines that support diskette changeline, such as the IBM Personal Computer AT.

DEVICE
Command

Note: DRIVER.SYS is not intended to drive IBM fixed disks. If a logical drive letter is desired for the fixed disk, use the **SUBST** command.

/N specifies the physical device is a nonremovable block device. A fixed disk is an example of a nonremovable block device.

/F:*f* specifies the device type (form factor). Choose from the table below. The default is 2.

Value	Device
0	160KB/180KB
0	320KB/360KB
1	1.2MB
2	720KB or others
7	1.44MB

EXAMPLE 1

To set up a logical drive (D) for a 720KB external diskette drive on an IBM PC XT (one internal diskette drive and a fixed disk), use the following command:

```
device=driver.sys /d:2
```

EXAMPLE 2

To be able to copy from a 720KB external diskette drive to the same drive, put the same command in the CONFIG.SYS file twice, which (for an IBM PC XT) assigns the logical drive letters D and E to the drive.

```
device=driver.sys /d:2
device=driver.sys /d:2
```

EXAMPLE 3

You can use DRIVER.SYS to copy from an internal drive to the same internal drive. Assume you have an IBM Personal Computer AT with a 1.2MB drive as the first physical diskette drive and a 320/360KB as the second physical diskette drive and a fixed disk. The CONFIG.SYS command should be:

```
device=driver.sys /d:0 /T:80 /S:15 /H:2 /C /F:1
```

This assigns the logical drive letter D to the first diskette drive. It can now be referenced as A and D. For example:

```
copy a:file1 d:
```

copies "file1" from one diskette to another diskette using the 1.2MB drive only. DOS prompts you to insert the diskette for the appropriate logical drive.

CONFIGURING

DEVICE
Command
Logical Drive Letter Assignment

General Rules For Drive Letters

The first physical internal diskette drive is assigned
A. The second internal diskette drive is assigned B.
The letters from C on are assigned in the order
devices (or device drivers) are encountered. The
existence of internal physical devices (diskettes and
fixed disks) is checked first; then the CONFIG.SYS
file is checked for the device drivers. For DOS to
recognize an external physical device the
CONFIG.SYS file must have the correct device
driver information.

The drive letter B is automatically used, even if there
is only one physical diskette drive, that is, on
machines with only one diskette drive, there are two
logical diskette drives A and B. In this case, the
parameter /D:1 is an error. The first fixed disk, or
the first block device driver cannot have a drive letter
assigned lower than C.

For machines with an external drive, if the external
device driver is loaded twice, where /D:*dd* is the
same, it generates two logical drives for the one
physical drive. This provides the ability to transfer
data from one diskette to another in that same drive.

This same concept can also be applied to internal
drives. In this case, DOS automatically loads a disk
device driver for the drive at setup time. By
including a DEVICE = DRIVER.SYS in the
CONFIG.SYS file for the same drive, two drive
letters will be associated with the same drive. The
command DEVICE = DRIVER.SYS /D:0 in the
CONFIG.SYS file at set up time causes DOS to load

another diskette drive for the first diskette drive. As described above, the drive letter depends on the number of diskette drives and the number of fixed disks in the machine. For a machine with two diskette drives and a fixed disk, the logical drive letter for the first diskette is drive D. With this setup you can copy files from the first physical diskette drive to the first logical diskette drive by referencing it as A and D.

The following table describes the logical drive letter assigned to the external device driver for certain machine configurations and values of /D:.

> **Note:** More than one external device driver can be installed at the same time even though this table shows one external device driver. The existence of any VDISKs will not affect the drive letter assignments described below if the DEVICE = VDISK.SYS commands are after the DEVICE = DRIVER.SYS commands in the CONFIG.SYS file.

CONFIGURING

DEVICE
Command

Internal diskette drives	Internal fixed disk drives	External drives attached?	Physical drive number (D:ddd)	Logical drive letter assigned
1	0	No	0	C:
1	0	No	1	error
1	1	No	0	D:
1	1	No	1	error
1	1	No	128	D:
1	2	No	0	E:
1	2	No	1	error
1	2	No	128	E:
1	0	Yes	0	C: *
1	0	Yes	1	error
1	0	Yes	2	C:
1	1	Yes	0	D:
1	1	Yes	1	error
1	1	Yes	2	D:
1	1	Yes	128	D:
1	2	Yes	0	E:
1	2	Yes	1	error
1	2	Yes	2	E:
1	2	Yes	128	E: *
1	2	Yes	129	E:
2	0	No	0	C:
2	0	No	1	C:
2	0	No	2	error
2	1	No	0	D:
2	1	No	1	D:
2	1	No	2	error
2	1	No	128	D:

DEVICE
Command

Internal diskette drives	Internal fixed disk drives	External drives attached?	Physical drive number (D:ddd)	Logical drive letter assigned
2	2	No	0	E:
2	2	No	1	E:
2	2	No	2	error
2	2	No	128	E:
2	2	No	129	E:
2	0	No	0	C: *
2	0	Yes	1	C: *
2	0	Yes	2	C:
2	1	Yes	0	D: *
2	1	Yes	1	D: *
2	1	Yes	2	D:
2	1	Yes	128	D: *
2	2	Yes	0	E: *
2	2	Yes	1	E: *
2	2	Yes	2	E:
2	2	Yes	128	E: *
2	2	Yes	129	E:

* The external drive is not recognized.

CONFIGURING

DEVICE
Command
PRINTER.SYS

Purpose:

Allows you to use code page switching on the IBM Proprinter Model 4201 and IBM Quietwriter III Printer Model 5202.

> **Note:** The U.S. user normally does not need to use PRINTER.SYS. To determine if you need to use this device driver, refer to Chapter 9, "Code Page Switching."

Format:

DEVICE = [*d:*][*path*]PRINTER.SYS LPT#[:] =
(*type*[,[*hwcp*][,*n*]])

or

DEVICE = [*d:*][*path*]PRINTER.SYS LPT#[:] =
(*type*[,[(*hwcp1*,*hwcp2*,...)][,*n*]])

Remark:

LPT# specifies the printer device and can be entered up to three times, one for printers LPT1, LPT2, and LPT3. The device name PRN may be used in place of LPT1.

type specifies one of the following printer types:

- IBM Proprinter Model 4201
- IBM Quietwriter III Printer Model 5202

hwcp specifies the code page image built into the hardware (437, 850, 860, 863, or 865).

For the IBM Quietwriter III Printer Model 5202, the *hwcp* can be one code page, such as 437, or it can be a pair of code pages, such as (437,850). For the IBM Quietwriter III Printer Model 5202, if two hardware

code pages have been specified, then no code pages can be prepared, and the value of *n* must equal zero.

n specifies the number of additional code pages that can be prepared. The value of *n* determines the number of buffers PRINTER.SYS will set up to hold code pages being prepared. The maximum number of code pages that can be prepared is 12.

The IBM Proprinter Model 4201 holds its hardware code page in ROM. When the IBM Proprinter Model 4201 is started, it copies the ROM code page into a RAM area in the printer. If a zero value is chosen for *n*, or *n* is not specified, PRINTER.SYS will still be able to prepare the IBM Proprinter Model 4201 with one code page by moving it from the 4201.CPI file directly into the RAM area in the printer.

The IBM Quietwriter III Printer Model 5202 supports font cartridges of different code pages but of the same sets of type styles. New code pages are prepared by physically changing the font cartridge. DOS 3.30 cannot tell from the printer if a font cartridge has been changed. If two code pages are specified for *hwcp*, DOS 3.30 assumes that the images of the code pages are permanently installed on the printer, and there will be no code page preparation required.

For example:

```
device=printer.sys lpt1:=(4201,437,1)
lpt2=(5202,437,0)
```

installs the code page switching support for the LPT1: and LPT2: devices. It instructs the LPT1: driver that the printer is a IBM Proprinter Model 4201 and the LPT2: driver that the printer is a IBM Quietwriter III Printer Model 5202. Both printers have the 437 code page built in. The LPT1: driver is

DEVICE
Command

able to hold one code page prepared by the MODE command, while the LPT2: driver can have one code page prepared. For additional information, refer to the MODE command in chapter 7 in this book.

> **Note:** A MODE prepare or MODE select should never be done while data is being printed by the PRINT command.

VDISK.SYS

The VDISK.SYS file on your DOS diskette is a device driver that simulates a disk drive by using a portion of your computer's memory as the storage medium. These simulated disks are called *virtual disks*. The following characteristics apply to virtual disks:

- Virtual disks are fast, since they operate at the speed of the computer's memory.

- You can install more than one virtual disk; each is referred to by a drive letter, in the same way you refer to disk drives. For example, if your computer has two diskette drives and no fixed disks, the diskette drives are referred to as drives A and B, the first virtual disk is referred to as C, the second as D, and so on.

- If you have an IBM Personal Computer AT with extended memory installed (starting at the 1MB boundary), you can use the extended memory as one or more virtual disks. Otherwise, virtual disks are located in low memory.

- Vdisk may alter the sector size from what you may have specified in CONFIG.SYS. The sector size is adjusted in order to address all clusters of a virtual disk.

- For each virtual disk, you can specify the amount of memory to be used (the "disk size"), the sector size, and the number of directory entries it is to contain.

- A volume label is created on each virtual disk to assist in its identification.

- Each virtual disk created increases the resident size of DOS by about 800 bytes for the VDISK.SYS device driver, plus the size of the virtual disk buffer you specify if the driver is installed in low memory.

- The contents of a virtual disk are lost if you restart the system or if power is lost.

- Virtual disks cannot be formatted. Each VDISK is installed in formatted form.

CONFIGURING

DEVICE
Command

Installing VDISK

To install the VDISK device driver, include this
statement in the CONFIG.SYS file:

device = [*d:*][*path*]vdisk.sys [*comment*][*bbb*]
[*comment*][*sss*][*comment*] [*ddd*][/E[:*m*]]

[*d:*][*path*] is the drive and directory path containing
the VDISK.SYS file.

[*comment*] contains ASCII characters in the range 20
through 126 except the slash /. For example:

```
device=c:\dos.dir\vdisk.sys buffer size=128
sector size=512 directory entries=16
```

The *bbb* is the virtual disk size in K bytes, and is
specified as a decimal integer value. The default
value is 64K bytes. The range of values is between
1K and the amount of available memory on your
computer. VDISK may adjust the amount of
memory actually used for the virtual disk as follows:

- If there is 64K or less available memory at the
  time VDISK is being installed, VDISK issues an
  error message and does not install the virtual
  disk.

- If the size you specify is less than 1K byte,
  VDISK uses the default value of 64K.

- If the specified size leaves less than 64K of
  available memory, VDISK adjusts the virtual disk
  size downward. VDISK always leaves a
  minimum of 64K of available memory after the
  installation of the virtual disk.

- The buffer size includes the space used by
  VDISK for a boot sector, the file allocation table

and directory entries, the available space for files is less than *bbb*.

The *sss* is the sector size in bytes. Allowable sizes are 128, 256, or 512. If sector size is omitted, or if an incorrect value is typed, VDISK uses the default value of 128. If you use your virtual disk to hold relatively small files, you may want to use a smaller sector size to minimize wasted space. Better performance is achieved with a large sector size.

The *ddd* is the number of directory entries (number of files) that the virtual disk can contain (one directory entry is required for each file). The default value is 64. The range of values is between 2 and 512. VDISK may adjust the value you entered.

- The value is adjusted upwards to the nearest sector size boundary. For example, if you specify a value of 10, and your sector size is 128, VDISK generates 12 directory entries (12 entries at 32 bytes each to round up to a multiple of the sector size).

- If the virtual disk size specified above is too small to hold the file allocation table, the directory, and two additional sectors, the directory size is adjusted downward by one sector at a time until these conditions are met. If the directory size reaches one sector and the conditions still cannot be met, VDISK issues an error message and the virtual disk is not installed.

- VDISK uses one of the directory entries to hold the volume label.

The /E parameter tells VDISK to use extended memory. Extended memory is memory at or above 1MB. The virtual disk buffer will be in extended memory and the device driver will be installed in low

CONFIGURING

DEVICE
Command

memory. More than one virtual disk can be installed in extended memory by including more than one DEVICE = VDISK.SYS command in the CONFIG.SYS file. The first device driver is installed at the 1MB boundary, the second immediately following the first, and so on. This parameter is valid only for an IBM Personal Computer AT system with extended memory. If you specify this parameter for a computer that does not have extended memory, an error message is displayed and the virtual disk is not installed.

Extended memory of up to 4MB may be used for one VDISK. To use additional extended memory, you must install more VDISKs.

The following example shows how to install a 160K-byte virtual disk with 512-byte sectors and 64 directory entries:

```
device=vdisk.sys 160 512 64
```

The m is the maximum number of sectors (of size sss) of data VDISK transfers at a time. The default for m is 8. The possible values for m are 1, 2, 3, 4, 5, 6, 7, and 8. When VDISK is operating in extended memory, interrupt servicing is suspended during data transfers. If there are very frequent interrupts occurring during these periods (as in high speed communications), some interrupts can be lost.

> **Note:** If some interrupts are being lost, isolate the problem by installing VDISK in non-extended memory. If the problem is resolved, adjust m (in extended memory) until no interrupts are lost. If an m of 1 and sss of 128 do not improve the situation, then VDISK cannot be used in extended memory in that environment. If installing VDISK in non-extended memory does not resolve the

problem, other areas should be investigated as the cause of the problem.

The next time you start DOS, VDISK displays the following message:

VDISK Version 3.3 virtual disk x

This message is displayed as an informative message to tell you that VDISK is attempting to install a virtual disk. It also tells you the drive letter x that is assigned to the virtual disk.

CONFIGURING

FCBS
Command

Purpose:

Allows you to specify the number of file control blocks (FCBs) that can be concurrently open by DOS.

Format:

FCBS = m,n

Remark:

The m specifies the total number of files opened by FCBs that can be open at one time. The default value is 4. The range of values for m is from 1 to 255.

The n specifies the number of files opened by FCBs that cannot be closed automatically by DOS if a program tries to have more than m files opened by FCBs at one time. The first n files opened by FCBs are protected from being closed. The default value is 0. The range of values for n is between 0 and 255.

Some application programs use file control blocks to create, open, delete, read and write to files. DOS keeps track of the least recently used FCB. If the program tries to open more than m FCB files, the action DOS takes depends on whether file sharing is loaded.

Notes:

1. The value of m must be greater than or equal to the value of n.

2. If a program receives critical errors due to FCB files being closed by DOS, increasing the value of m may prevent these errors from occurring.

3. If a program uses two or more different FCBs to refer to the same file, DOS only counts this as one FCB used.

4. If you specify the FCBS command in your configuration file, the resident size of DOS is increased.

With File Sharing

If file sharing is loaded, and a program tries to open more than *m* files, DOS closes the least recently used FCB and opens the new file. Note that the first *n* files are not included in the list of files that DOS tracks for the least recently used FCB. Therefore, they are protected from being closed this way. If a program tries to read or write to a file that has been closed because it is the least recently used FCB, DOS issues the following message:

```
FCB unavailable
Abort, Fail?
```

Note: If you set *m* equal to *n*, it does not allow any files to be closed by DOS if a program tries to open more than *m* files. If a program tries to open more than *m* files, DOS does not open the new file.

CONFIGURING

FCBS
Command
Without File Sharing

If file sharing is not loaded, the number of files that
can be open at the same time is not limited. The
FCBS command is only applicable when file sharing
is loaded.

Examples:

To set the total number of FCB files that can be
open at one time to 3, and the number protected
from being closed to 1, include this command in the
CONFIG.SYS file.

```
fcbs=3,1
```

Purpose:

Allows you to specify the maximum number of files that can be open concurrently.

Format:

FILES = x

Remark:

The x can be a number between 8 and 255. The default value is FILES = 8.

Accessing a File

All file accesses (reads, writes, closes) can be performed by telling DOS which handle to use. When an application opens a file in this manner, DOS constructs a control block in its own memory on behalf of the application, in an area that was set aside when DOS started. The size of this area (and consequently, the maximum number of file that can be concurrently open), depends on the value specified in the FILES= command.

The default value is FILES = 8; that is, no more than 8 files can be open at the same time. There is no effect on the number of files that can be concurrently open using the traditional (OPEN FCB) functions. This default value is sufficient for the majority of operating environments. However, if applications are installed that result in error messages indicating, too many open files, the FILES= command should be used to provide DOS with additional files.

CONFIGURING

FILES
Command
Number of Files Opened

The value specified in FILES= becomes the new
maximum number of files that DOS allows to be
concurrently open.

Note that this value is the maximum number of files
allowed for the entire system. This includes files in
use by currently running foreground tasks (programs
such as COMP and CHKDSK) and background
tasks like PRINT and the network. The maximum
number of file handles that a process can have open
is 20 (default) or 65534 (if extended). This number
includes the 5 predefined handles for standard input,
output, error, auxiliary, and printer. So the limit on
files for the system is specified by FILES=, and the
limit on handles for each process is up to 65534.

If you specify FILES= in your configuration file,
the size of the resident portion of DOS increases by
48 bytes for each additional file above the default
value of 8. Consequently, the memory available to
the application is reduced by the same amount. See
function calls 3CH through 46H and 67H in Chapter
6 of the *DOS Technical Reference* for descriptions of
the file – handling functions.

LASTDRIVE
Command

Purpose:

Sets the maximum number of drives that you may access.

Format:

LASTDRIVE = x

Remark:

The x can be any alphabetic character A through Z. It represents the last valid drive letter that DOS may accept. The default value is LASTDRIVE = E.

The minimum number you can set LASTDRIVE equal to is the number of drives you have installed on your computer. If x is less than the number of physical drives on your computer, this command is ignored in the configuration file.

Examples:

To set the number of drives equal to 16, include this command in the CONFIG.SYS file:

```
lastdrive=p
```

SHELL
Command

Purpose:

Allows you to specify the name and location of a top – level command processor that DOS initialization loads in place of COMMAND.COM.

Format:

SHELL= [*d*:][path]*filename*[.*ext*] [*parm1*] [*parm2*]

Remark:

System programmers who develop their own top – level command processor should remember to include provisions for handling interrupts 22H, 23H and 24H, and for reading and executing commands. Because the internal commands and batch processor reside in COMMAND.COM., these functions will not be available to the user unless they are duplicated in your command processor.

SHELL does not affect COMSPEC= or BASIC's SHELL command. To assure that the same command processor is used for reloading (just the transient portion), you must set COMSPEC= to point to that command processor. Refer to the SET command in Chapter 7 for information on COMSPEC.

The following parameters are defined for
COMMAND.COM.

/E:*xxxxx* specifies a base 10 integer and indicates the
number of bytes to set the environment size. This
number must be in the range of 160 to 32768. It is
rounded up to the nearest paragraph boundary. If
the size contains any non-numeric characters or is
less than 160, the environment is set to 160 bytes. If
the size is greater than 32768 the environment is set
to 32768.

> **Note:**   Each string in the environment is
> terminated by an invisible null character, and
> the entire environment is terminated by two
> null characters. The number of visible
> characters in the environment is less than the
> size specified.

/P causes COMMAND.COM to remain loaded
and to execute AUTOEXEC.BAT once it is
installed.

CONFIGURING

STACKS
Command

Purpose:

Allows you to override the default stack resources.

Format:

STACKS = *n,s*

Remark:

n is the number of stack frames. The range of values is 8 to 64.

s is the size (in bytes) of each stack frame. The range of values is 32 to 512.

A special case of *n* = 0 and *s* = 0 indicates that STACKS support should not be installed. For example:

```
stacks=0,0
```

specifies that no dynamic stacks are to be provided. When set to zero, DOS does not intercept any interrupts and uses only the internal DOS STACKS.

If STACKS = is not included in CONFIG.SYS, the default values are *n* = 0 and *s* = 0 for the IBM PC, IBM PC XT, and the IBM Portable PC. The default values for other machines are *n* = 9 and *s* = 128.

> **Note:** Increasing stack resources reduces available memory. It is advised that you increase the number of stack frames first when trying to alleviate the stack error condition.

Each time a hardware interrupt occurs, DOS allocates one frame from the stack pool. After the interrupt has been processed, DOS returns the stack frame to the pool.

Chapter 5. Using Tree-Structured Directories

DIRECTORIES

Introduction

This chapter describes how to organize files into groupings called directories. It tells you how to create, access, remove and display the contents of your directories. It also tells you how to display the entire directory structure of your disk.

Why Use Directories?

A fixed disk or a high capacity diskette can have many files. If you keep a large number of files in one place on your fixed disk or diskette, it can take longer for DOS to find a particular file. Keeping files in related groups in directories can reduce the time required to locate a file.

How Directories Are Organized

To give you an idea of how you might group files into directories, let's assume your company has two departments—sales and accounting —that use an IBM Personal Computer. All of the sales and accounting files are kept on the computer's fixed disk.

The directory structure might look like this:

```
                           ┌─────────┐
                           │ ROOT DIR│
                           └─────────┘
          ┌───────────────────┴───────────────────┐
     ┌─────────┐                             ┌─────────┐
     │  SALES  │                             │ ACCTNG  │
     └─────────┘                             └─────────┘
      ┌────┴────┐                             ┌────┴────┐
  ┌────────┐ ┌────────┐                  ┌────────┐ ┌────────┐
  │ LINDA  │ │  RUTH  │                  │  LEE   │ │  RAE   │
  └────────┘ └────────┘                  └────────┘ └────────┘
  ┌────────┐ ┌────────┐                ┌──────────┐ ┌────────┐
  │REPORTS │ │REPORTS │                │ PROGRAMS │ │REPORTS │
  └────────┘ └────────┘                └──────────┘ └────────┘
                 │                            │
            Weekly.rep                    Basic.com
```
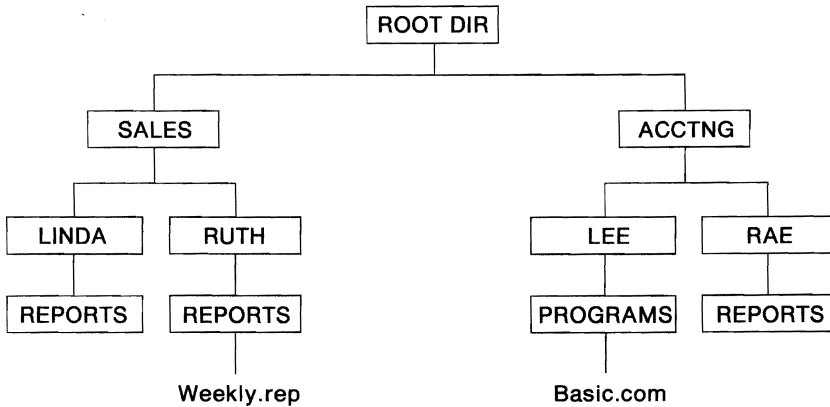
This directory structure reflects the organization of each of the two departments. Directories can be created on different levels. The highest level is the *root directory* (denoted as "ROOT DIR" in the figure on the previous page). DOS creates a root directory on each disk when you format it. When you start DOS on your computer, you are in the root directory.

Just below the root directory shown in the previous diagram, are two *subdirectories* — one for sales and one for accounting. One level below the subdirectory named SALES, you find two more subdirectories. These two subdirectories can contain files for the salespersons, Ruth and Linda. The complete name of Ruth's subdirectory is actually \SALES\RUTH. The complete name of Linda's subdirectory is \SALES\LINDA.

Ruth and Linda can store files related to their work in their respective subdirectories. But suppose Ruth and Linda want to keep all files related to reports separate from their other files. On the next level, each has a subdirectory named REPORTS. The complete name of each subdirectory is \SALES\RUTH\REPORTS and \SALES\LINDA\REPORTS.

> **Note:** Sales files of a general nature, not related to a particular salesperson, could be stored in SALES.

Directory Entries

A directory *entry* can be a file, a subdirectory, or a volume label. The number of entries that the root directory of a disk can contain depends on the type of disk. The root directory of a single-sided 160/180KB diskette can hold 64 entries, while the root directory of a double-sided 320/360KB and 720KB diskette can hold 112 entries. The root directory of a double-sided 1.44MB diskette can hold 224 entries. The root directory of a high-capacity 1.2MB diskette can hold 224 entries. There can be 512 entries in the root directory of a fixed disk.

Unlike the root directory, subdirectories can contain any number of entries, limited only by the amount of available space on the disk.

Subdirectory names follow the same format as file names. They can consist of 1 to 8 characters followed by an optional extension of a period and 1 to 3 characters. All characters valid for file names are also valid for subdirectory names.

DIRECTORIES

Accessing Your Subdirectories

You need to know how to get to your subdirectories and how to access files located in a subdirectory other than the one you are working in. This section discusses:

- The current directory

- The CHDIR command (Change Directory command)

- Specifying a path to a file

- Using the PATH and APPEND commands

- Using PATH and APPEND commands in a batch file.

The Current Directory

The *current directory* is the one you are currently working in or the one you *were* working in on a different drive. DOS remembers which directory was current on each of your drives, even though you may not be presently accessing any of those drives. When DOS starts, the root directory is the current directory (until you change directory using the CHDIR command).

Changing Directories with CHDIR

Use the CHDIR (CD) command to move in and out of your directories (make a different directory the current directory). For example, if you are in the root directory, and want to work with files in \SALES\LINDA\REPORTS, type:

```
cd \sales\linda\reports

(Press Enter)
```

You must "go through" SALES and LINDA to get to REPORTS. The leading backslash is really not necessary if you are currently in the root directory.

If you are in the LINDA subdirectory and you want to change to the REPORTS subdirectory, you type:

```
cd reports

(Press Enter)
```

You always get back to the root directory no matter where you are in the directory structure, by typing:

```
cd \

(Press Enter)
```

The backslash (\) signifies the root directory.

The longest path that you can specify with CHDIR is 63 characters.

Specifying a Path to a File

When you want DOS to locate a file, and you do not specify a particular directory, DOS searches only the current directory of your default drive.

DOS can search for a file in a directory other than the current directory of your default drive. To do so, DOS must know three things — the drive, the name of the directory, and the name of the file.

These three components can be combined to create a *path* to a file. For example, if your default drive is A, and you want to copy a file named WEEKLY.REP from drive C in the directory \SALES\RUTH\REPORTS to drive A, type:

```
copy c:\sales\ruth\reports\weekly.rep

(Press Enter)
```

This command copies the file WEEKLY.REP from a directory three levels below the root on drive C to the current directory on drive A. Note that the file name is the last item in the path.

Using the PATH and APPEND Commands

You can use the PATH command to tell DOS where to search for executable files that it does not find in the current directory. This search is valid only for files with an extension of .COM, .EXE, or .BAT. Data files cannot be located using PATH.

You can use the APPEND command to tell DOS where to search for data files that it does not find in the current directory. APPEND finds files not found by PATH.

To start a search from the root directory, the path specified in the PATH or APPEND command must begin with a backslash. Otherwise, the search begins at the current directory.

Let's suppose that you have several applications that require BASICA.COM in order to run. BASICA.COM is only on drive C in the directory \ACCTNG\LEE\PROGRAMS. Your application programs are on diskette and may be run from either drive A or drive B.

You can set the PATH so that DOS looks for BASICA.COM, or any other executable file that may be needed to run your applications or manage your files. DOS searches the directories in the exact order that you specify in the PATH command. Given the diagram at the beginning of the chapter, a valid path is:

```
path c:\sales\linda\reports;c:\acctng
\lee\programs
```

After you start the application program, at a specific point, BASICA.COM is required in order for the program to continue. In this example, DOS searches the current directory of the default drive and then the path that you set when you started the computer. DOS finds the required file in \ACCTNG\LEE\PROGRAMS on drive C. Your application program can continue because BASICA.COM has been invoked.

The example below shows a program that needs to access WEEKLY.REP that is not on the A or B diskettes. Type in the following APPEND command:

```
append c:\sales\ruth\reports
```

After you start the application, DOS searches the \SALES\RUTH\REPORTS directory on drive C to find the file WEEKLY.REP.

DIRECTORIES

For more information, see the PATH and APPEND
commands in Chapter 7.

Using PATH and APPEND in a Batch File

You can avoid having to set the PATH each time
you turn on your computer. Include the names of
your most-used directories in a PATH statement in
an AUTOEXEC.BAT file in the root directory of the
disk from which you start DOS.

AUTOEXEC.BAT is a special type of batch file that
DOS looks for when you first start your computer.
If DOS finds AUTOEXEC.BAT in the root
directory, it executes the statements it finds there.
The previous example is a valid path that can be
included in an AUTOEXEC.BAT file.

Using Directory Commands

The following commands help you create and
manage your subdirectories and directory structure:

- MKDIR (MD)—used in making a new
  subdirectory.

- RMDIR (RD)—used in removing a subdirectory.

- CHDIR (CD)—used in displaying and changing
  the current directory.

- TREE—used in displaying the entire directory
  structure of a disk.

DIRECTORIES

Making a Subdirectory

Use the MKDIR (MD) command to make a new subdirectory. Be sure to include the appropriate drive and path, ending with the name of the new subdirectory you want created.

Let's assume you want to add the PAYMENTS subdirectory one level below
\SALES\LINDA\REPORTS.
Type the following:

```
MD \sales\linda\reports\payments

(Press Enter)
```

The resulting subdirectory structure looks like this:

```
                          ┌──────────┐
                          │ ROOT DIR │
                          └──────────┘
         ┌───────────────────┴──────────────────────┐
    ┌─────────┐                                 ┌─────────┐
    │  SALES  │                                 │ ACCTNG  │
    └─────────┘                                 └─────────┘
     ┌───┴────┐                                  ┌────┴─────┐
┌─────────┐ ┌────────┐                     ┌─────────┐ ┌────────┐
│  LINDA  │ │  RUTH  │                     │   LEE   │ │  RAE   │
└─────────┘ └────────┘                     └─────────┘ └────────┘
     │          │                               │          │
┌─────────┐ ┌─────────┐               ┌────────────┐ ┌─────────┐
│ REPORTS │ │ REPORTS │               │  PROGRAMS  │ │ REPORTS │
└─────────┘ └─────────┘               └────────────┘ └─────────┘
     │          │                            │
┌──────────┐ Weekly.rep               Basica.com
│ PAYMENTS │
└──────────┘
```
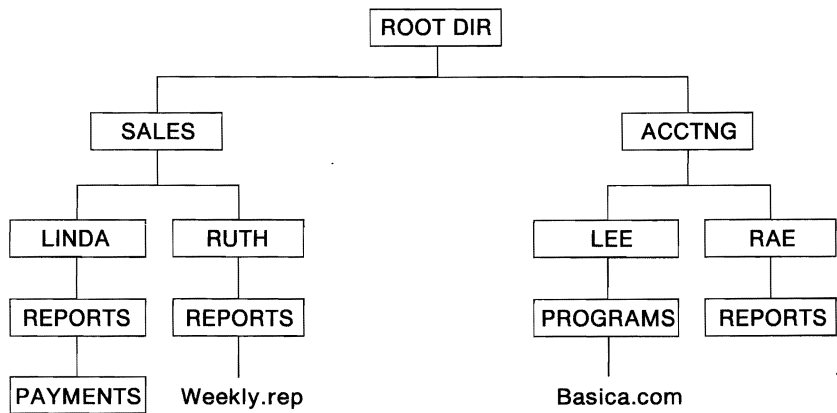
Assume you want to add a subdirectory for a third salesperson just below the SALES subdirectory. The salesperson is Eileen. If you are in the root directory, type:

```
md \sales\eileen
```

```
(Press Enter)
```

If you are in the SALES directory, type:

```
md eileen
```

```
(Press Enter)
```

The directory structure of your fixed disk now looks like this:

```
                          ┌──────────┐
                          │ ROOT DIR │
                          └──────────┘
         ┌───────────────────┴───────────────────┐
     ┌───────┐                               ┌─────────┐
     │ SALES │                               │ ACCTNG  │
     └───────┘                               └─────────┘
   ┌─────┼─────────┐                       ┌──────┴──────┐
┌───────┐┌──────┐┌────────┐            ┌──────┐      ┌──────┐
│ LINDA ││ RUTH ││ EILEEN │            │ LEE  │      │ RAE  │
└───────┘└──────┘└────────┘            └──────┘      └──────┘
┌─────────┐┌─────────┐              ┌──────────┐  ┌─────────┐
│ REPORTS ││ REPORTS │              │ PROGRAMS │  │ REPORTS │
└─────────┘└─────────┘              └──────────┘  └─────────┘
┌──────────┐ Weekly.rep               Basica.com
│ PAYMENTS │
└──────────┘
```
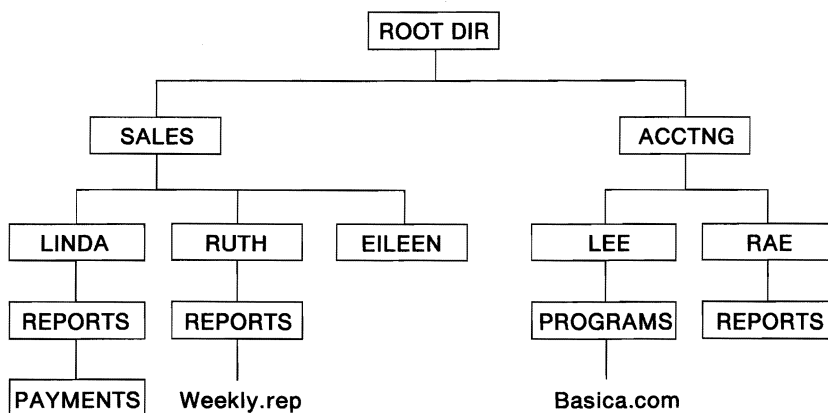
Removing a Subdirectory

Use the RMDIR (RD) command to remove a subdirectory. You cannot remove a subdirectory by using the ERASE or DEL commands.. Before removing a subdirectory, keep the following in mind:

- A subdirectory can be removed only if it is empty. That is, it contains only the special entries (.) and (..). When you display the contents of a subdirectory, using the DIR command, you see those two special entries listed.

  The (.) entry in a subdirectory represents the current directory.

  The (..) entry in a subdirectory represents the parent directory.

- Only one subdirectory can be removed at a time — the last one specified in the path.

- The root directory and the current directory cannot be removed.

Let's assume you want to remove the REPORTS subdirectory from \SALES\RUTH\REPORTS.

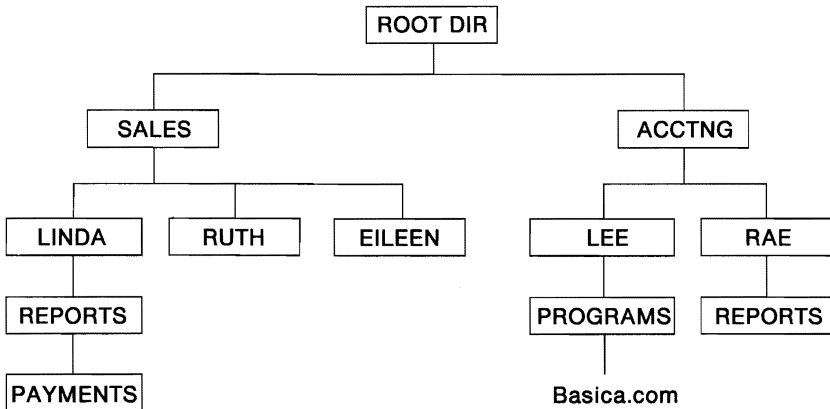- If you are in the root directory, change directory to the subdirectory you want to remove by typing **CD \SALES\RUTH\REPORTS.**

- Type **erase** *.* to remove all files in the \SALES\RUTH\REPORTS subdirectory.

  Note: No files are erased from the SALES or RUTH subdirectories, only from the REPORTS subdirectory.

- Change directory to the level above the REPORTS subdirectory that you want to remove by typing **CD ..**

- Type **RD REPORTS** to remove the subdirectory.

The directory structure now looks like this:

```
                        ┌──────────┐
                        │ ROOT DIR │
                        └──────────┘
          ┌──────────────────┴───────────────────┐
      ┌───────┐                              ┌─────────┐
      │ SALES │                              │ ACCTNG  │
      └───────┘                              └─────────┘
   ┌──────┼────────┐                      ┌──────┴──────┐
┌───────┐ ┌──────┐ ┌────────┐          ┌─────┐      ┌─────┐
│ LINDA │ │ RUTH │ │ EILEEN │          │ LEE │      │ RAE │
└───────┘ └──────┘ └────────┘          └─────┘      └─────┘
┌─────────┐                        ┌──────────┐ ┌─────────┐
│ REPORTS │                        │ PROGRAMS │ │ REPORTS │
└─────────┘                        └──────────┘ └─────────┘
┌──────────┐                            │
│ PAYMENTS │                       Basica.com
└──────────┘
```

Displaying and Changing the Current Directory

As previously mentioned, you change from one subdirectory to another using the CHDIR (CD) command. See the section entitled, "Changing Directories with CHDIR" earlier in this chapter for more information.

You can also display which subdirectory you are currently working in by typing:

```
cd
```

(Press Enter)

Displaying the Directory Structure

Use the TREE command to find out the names of each subdirectory on a disk. For example, to see the directory structure for disk C, type the following:

```
tree c:
```

For more information on the TREE command, see Chapter 7 of this book.

Where DOS Looks for Commands and Batch Files

When you type a command, that applies to an external file, DOS must locate the file before it can execute the command. You specify the location (path) of the command file by preceding the PATH command with a path name.

You can use the PATH and APPEND commands to tell DOS which paths to search if it does not find the file in the current directory or the path.

> **Note:** This search is valid only for files with .COM, .EXE, or .BAT file name extensions. Data files can be located by using the APPEND command, but the PATH command cannot be used to locate data files.

Chapter 6. Standard Input and Standard Output

STANDARD I/O

Introduction

This chapter describes how you can use redirection, piping, and filters with standard input and standard output. It also describes how to invoke a secondary command processor.

Use redirection of standard input and standard output to change the standard input device or standard output device.

Use piping of standard input and standard output to use the output of one program as the input to another program.

Use filters to sort the input or output of a program, or to find the occurrence of a string in a text file, or to display a screen of data and then pause with the message **--More--**.

Redirection of Standard Input and Output Devices

DOS provides internal functions that programs can use to receive input and display or print output. These functions are called *standard input* and *standard output*.

The DOS standard input and output redirection feature allows a program to receive its input from a source other than the standard input device, or direct its output to a device other than the standard output device.

When you first start DOS, the standard input device is the IBM Personal Computer keyboard, and the

STANDARD I/O

standard output device is the display unit (screen).
However, DOS lets you specify input and output
devices other than the keyboard and the screen.
Refer to the CTTY command, described in Chapter 7
of this book to see how you can specify a remote
terminal as the standard input and output device
instead of the keyboard and screen.

DOS handles the mapping of the logical (standard
input and output) devices to the real devices in a way
that is not apparent to the application program. The
application program does not need to be aware of
the physical device that is actually being used for
standard input and standard output.

> **Note:** Any output sent to the standard error
> device cannot be redirected.

This means that you can run your application
program using the keyboard and screen for your
input and output device, and then run your
application at another time using a remote terminal
for your input and output device. You do not have
to change the application program, which continues
to use the standard input and standard output. DOS
goes to the correct physical device on behalf of the
application program.

The standard input and output devices can be
redirected to or from files or other devices by the
following DOS command line parameters:

> *[d:][path]filename[.ext]*

>   Causes *filename[.ext]* to be created (or truncated
>   to zero length) and then assigns standard output
>   to that file. All output that would normally have
>   gone to the screen from the command is placed in
>   the file.

> > *[d:][path]filename[.ext]*

>   Causes *filename[.ext]* to be opened (created if
>   necessary) and positions the write pointer at the

end of the file so that all output is appended to the file.

< [*d:*][*path*]*filename*[*.ext*]

Causes standard input to be assigned to *filename*[*.ext*]. All input to the program comes from this file instead of from the keyboard.

CAUTION
When using this method of providing input to a program, be sure *all* of the program's input is in the file. If the program attempts to obtain more input after end — of — file is reached, DOS is unable to supply the input, and processing stops. You may have to restart the system by pressing Ctrl-Alt-Del.

Note: If an application does not use DOS function calls to perform standard input and output (for example, it puts text directly into the video buffer), then redirection will not work for that application.

Examples

In the following example, the output of the DIR command is sent to the printer:

```
dir >prn
```

In the following example, the output of the DIR command is sent to the file DIRLIST:

```
dir >dirlist
```

In the following example, the program MYPROG will receive its input from file INPUT.TXT, instead of from the keyboard:

```
myprog <input.txt
```

Piping of Standard Input and Output

The DOS piping feature allows the standard output
of one program to be used as the standard input to
another program. DOS uses temporary files to hold
the input and output data being piped. These
temporary files are created in the root directory of
the default drive.

The programs being piped must not cause the piping
files to be erased or modified.

Piping is the chaining of programs with automatic
redirection of standard input and output (refer to
"Redirection of Standard Input and Output Devices"
in this chapter for additional information). The
names of the programs to be chained are separated
by the vertical bar (¦) character on the command
line.

The following are typical examples of using the
piping feature for a program that does all of its input
and output to the standard input and output devices.
For example, if the program named SORTABC read
all of its input from standard input, sorted it, and
then wrote it to the standard output device, the
command:

```
dir ¦ sortabc
```

would generate a sorted directory listing. This causes
all standard output generated by the DIR command
to be sent to the standard input of the SORT
program.

To put the sorted directory in a file, you would type:

```
dir ¦ sortabc > file
```

If you want the file to contain only the directory
entries for subdirectories, you could type:

```
dir ¦ find"<DIR>" ¦ sortabc > file
```

DOS Filters

A filter is a program or command that reads data from the standard input device, modifies the data, then writes the result to the standard output device. Thus, the data has been "filtered" by the program. For example, one of the filters on your DOS diskette is called SORT. SORT reads input from the standard input device (normally the keyboard), sorts the lines of data, then writes the sorted results to the standard output device (normally the screen). With the redirection capabilities described earlier in this chapter, you can cause SORT to receive its input from some other source, and to send its output to a different destination. For example,

```
sort <myfile >result
```

will cause SORT to read the file MYFILE, sort the lines within it, and write the sorted output to file RESULT.

By using the piping feature, you can cause a filter to receive its input from the output of another command, or to send its output to the input of another command. For example,

```
dir ¦ sort
```

causes the output listing from the DIR command to be used by SORT as its input. The listing will be sorted and the result displayed on the standard output device.

There are three filters on your DOS diskette, and they are described as individual commands in Chapter 7. They are:

SORT Sorts text data.

FIND Searches files for occurrences of specified strings of text.

MORE Displays a screen full of data at a time, then pauses with the message **--More--**.

You can add your own filter to the filters that have been supplied; just write a program that reads its input from the standard input device, and writes its output to the standard output device.

> **Note:** If an application does not use DOS function calls to perform standard input or output (for example, it puts text directly into the video buffer), filters will not work for that application.

Chapter 7. DOS Commands

COMMANDS

Introduction

You can use DOS commands to:

- Compare, copy, display, erase, rename files.

- Format fixed disks and diskettes.

- Execute system programs, such as EDLIN, and your own programs.

- Set various printer and screen options.

- Request DOS to pause.

- Transfer DOS to another diskette.

- Cause printer output to be directed to the Asynchronous Communications Adapter.

- Recover a specific file from a damaged disk, or recover the entire disk or diskette.

- Print the contents of a graphics display screen on a printer.

- Print files on the printer while the system is doing other work.

- Backup and restore files on a fixed disk.

- Define a remote device as your primary console.

- Sort text data.

- Search files for occurrences of specified strings of text.

- Display a screen full of data at a time.

- Set new system prompt.

- Set the system environment.

- Install file sharing.

- Make a file read–only.

- Add or change a disk volume label.

- Ask DOS to check for Ctrl–Break to exit a program or command at any time.

- Create, remove, and change subdirectories.

- Display all the directories on a disk.

- Check for disk errors.

- Set the date and time.

- Find out what's on a disk.

- Select the date and time format.

- Join a drive to a directory on another drive so that you can access a drive through a subdirectory.

- Substitute a drive letter for another drive or directory in order to access that drive or directory using only the drive letter.

- Copy an entire tree structure.

- Set, change, and check device code pages.

DOS Commands and the Network

Although you can use most of the DOS commands on network disks, there are a few DOS commands you cannot use.

> **Note:** Using these commands with a network device causes an error message.

- CHKDSK

- DISKCOMP

  > **Note:** Instead of DISKCOMP, use the COMP (Compare) command to compare files.

- DISKCOPY

  > **Note:** Instead of DISKCOPY, use the COPY or XCOPY command to copy files.

- FORMAT

- JOIN (cannot JOIN a network drive to a local drive)

- RECOVER

- SUBST (cannot substitute a drive letter for a network path)

- SYS

- PRINT (cannot use PRINT on a network server computer)

- FDISK

- LABEL (cannot change the label on a network disk)

These commands are valid for your disks, directories, and printers that are not on the network.

Types of DOS Commands

The two types of DOS commands are *internal* commands and *external* commands.

Internal commands execute immediately because they are built into DOS. Therefore, once DOS is loaded, you do not need the DOS diskette in a drive to use these commands.

External commands are on disks as program files. They must be read from the disk before they are executed. This means that the disk containing the command must be in a drive, or DOS is unable to find the command.

Any file with a file name extension of .BAT, .COM or .EXE is considered an external command. This allows you to develop your own unique commands and add them to the system. (For example, programs such as FORMAT.COM and COMP.COM are external commands.)

When you select an external command, you do not have to include the file name extension.

Entering a DOS Command

Use the following format notation to enter DOS commands:

[ ]   Items shown inside square brackets are optional. To include optional items, type only the information inside the brackets. Do not type the brackets.

CAPS Words shown in capital letters are called *keywords*. The DOS command names are keywords. You can type keywords in any combination of uppercase and lowercase letters.

italics Items shown in lowercase italic letters mean that you are to substitute the item. If italic items are inside brackets, then they are optional. For example,

filename

indicates that you should type the name of your file in place of the word *filename*.

| A vertical bar means either/or. Choose one of the separated items and type it as part of the command. For example,

ON | OFF

indicates that you should type either ON or OFF, but not both. Do not type the vertical bar.

. . .   An ellipsis indicates that you can repeat an item.

Include all punctuation such as commas, equal signs, question marks, asterisks, colons, slashes and

backslashes. Punctuation shown inside brackets is
optional.

Information Common to All DOS Commands

The following information applies to all DOS
commands:

- The DOS prompt consists of the default drive
  letter and the character " > ." For example, A >
  is the DOS prompt that denotes A as the default
  drive. You can change the DOS prompt by using
  the PROMPT command.

- When a command has finished executing, the
  DOS prompt reappears on the screen. If no error
  messages appear before the DOS prompt returns,
  the command has been executed successfully.

- Commands are usually followed by one or more
  parameters.

- You can type commands in uppercase or
  lowercase or a combination of both. For
  example, you can type:

  ```
  Dir A:
  ```

- DOS searches the current directory of the drive
  you specify or the default drive (if you do not
  specify a drive) to find a command or batch file
  you typed. If not found, and you have specified
  a PATH command, DOS searches the directories
  listed in the path.

- Commands that allow you to enter file names can
  accept a path (directory) name before the file
  name.

- Commands and parameters *must* be separated by delimiters (space, comma, semicolon, equal sign, or the tab key). The delimiters can be different within 'one command. For example, you could type:

```
copy oldfile.rel;newfile.rel
rename,thisfile thatfile
```

- Do not separate the three parts of a filespec (d:filename.ext). The colon and period already serve as separators.

- In this book, a space is used as the delimiter in the commands.

- In this book, *"Press any key,"* means "Press any *character* key."

- To stop a command while it is executing, press Ctrl – Break. Ctrl – Break is recognized only while the system is reading from the keyboard or printing characters on the screen, unless you have used BREAK = ON in your configuration file or have issued a BREAK ON command. Thus, the command may not end immediately when you press Ctrl-Break.

- Commands start executing only after you press the Enter key.

- Global file name characters and device names are not allowed in a command name. You can only use them in file names and file name extensions.

- For commands displaying a large amount of output, you can use the **Pause Screen** function to suspend the display of the output. Press any character key to continue the display.

- You can use the function keys and the DOS editing keys described in Chapter 2 of the *DOS User's Guide* while typing DOS commands.

- Drives are referred to as *source* drives and *target* drives. A source drive is the drive you transfer information *from*. A target drive is the drive you transfer information *to*.

- When an external command is typed, DOS searches for it in the current directory of the default or specified drive. If not found, DOS continues searching for it in the directories listed in the most recent PATH command.

- If you type any of these characters <, >, or ¦ in a command, DOS treats them as redirection and piping characters.

- You can specify a drive and path before external commands. This means that the external command file can be in a directory other than the current directory. For example, if the file FORMAT.COM is in the directory \LEVEL1 on drive B, you can type:

```
b:\level1\format
```

DOS Commands

This section presents a detailed description of the DOS commands. The commands appear in alphabetic order. The description includes the purpose, format, and type of each command. Examples are provided where appropriate.

Purpose:

Locates files outside of the current directory that have extensions other than .COM, .EXE, and .BAT.

Format:

The first time APPEND is loaded:

*[d:][path]*APPEND *d:path*[;[*d:*]*path* . . .]

or

*[d:][path]*APPEND [/X][/E]

After APPEND has been loaded:

APPEND *d:path*[;[*d:*]*path* . . .]

or

APPEND [;]

Type:

Internal   External

***   ***

Remark:

Specify the parameters:

[d:][path] before APPEND to specify the drive and path that contain the APPEND command.

[d:][path] after APPEND to specify the path to search. Paths cannot be specified the first time the APPEND command is loaded if either /X or /E are also specified.

APPEND
Command

; to separate the APPEND paths or to request the list to be reset to null if the semi-colon is the only parameter.

/X to process SEARCH FIRST, FIND FIRST, and EXEC functions. Commands such as COMP and DIR use the SEARCH FIRST functions to search for files. Commands such as BACKUP, RESTORE, and TREE use the FIND FIRST function to locate files. DOS uses the EXEC function any time a command is entered.

> **Note:** If APPEND has been loaded with /X, before using BACKUP or RESTORE, APPEND must be issued using null (;).

Once the APPEND command is loaded into memory, it then becomes an *internal* command, and a path before APPEND is no longer needed.

/E is used to keep the APPEND paths in the DOS environment, similar to the DOS path command. APPEND searches the environment on each call to find the path. The DOS environment values may be viewed and changed with the APPEND and SET commands.

If the /E is not specified, the path string is held within the APPEND command. The paths are not stored in the environment and can only be viewed or changed by using the APPEND command.

/X and /E can only be specified on the first invocation of the APPEND command.

Technical Note: The environment is limited to the current command processor. If another command processor is loaded, or if the current one is exited, changes to the environment are lost. To ensure that

all processes are affected by changes to the APPEND path string, do not use /E.

Each time an APPEND command is entered, it takes the place of the preceding APPEND command. The appended directories can be "local" directories on your computer, or "remote" directories on a server computer, or a combination of both.

WARNING!

Some applications read a file from an appended directory and then write the file back out to the disk. The application writes the file in the current directory, **leaving the original copy unchanged.**

You can append as many directories as you can specify in 128 characters. The search sequence for a specified file is:

1. The specified directory, or the current directory if no directory is specified.

2. The directories indicated by the current APPEND command.

If you use the ASSIGN command, the first APPEND command must be entered before the ASSIGN command.

Why Use APPEND?

The APPEND command allows you to store applications only once on your fixed disk. Those applications can be used without changing to the directory that contains them.

For example, correspondence can be sorted into categories, by subject or content. Rather than

APPEND
Command

duplicate the editor, word processor, and spelling aid programs in each letter category or directory, you can install those programs and their associated operating files, in one directory--C:\APPS.

Assume directories have been created for each letter. Before you load any word processing, editing or spelling aid application, use one of the following sets of commands:

```
path c:\apps
append /e
append c:\apps
```

or

```
append /e /x
append c:\apps
```

Now you can use the application that was installed in C:\APPS as if it were in your current directory. Since the files the application needs to operate (that do not have an extension of .COM, .EXE or .BAT) are in C:\APPS the application will find them with the help of APPEND. To edit a file in C:\TEXT you would change to the directory that the file is in and execute your application. When you save the file, the new version will be written to the current directory. For example:

```
c:
cd \text
```

Notes:

1. Erroneous information in the paths, such as invalid drive specifications or imbedded delimiters, will not be detected until DOS actually needs to search the specified paths.

2. If a path is specified that no longer exists, DOS ignores that path and goes on to the next.

3. PATH finds only executable files, such as .COM, .EXE, and .BAT files. PATH does not find files with other extensions. APPEND finds any extension.

4. A copy of the environment is saved with terminate and stay-resident programs. Loading programs with a resident portion (MODE, PRINT, GRAPHICS) before setting a large path saves usable memory.

5. Terminate and stay-resident programs are loaded above the environment area so growth of the environment is limited to 128 bytes or the current size, whichever is greater (refer to the SHELL= command in Chapter 4 of this book for setting of the environment size.)

6. APPEND /x may cause problems with some applications. If you experience problems using the /x option, you may want to use the APPEND command without it.

WARNING!
Do not use the DOS 3.30 APPEND command with the APPEND command from either the IBM PC Network program 1.00 or the IBM PC LAN program 1.10.

APPEND
Command

APPEND uses the following system functions (int 21H):

```
FCB  open       - 0FH
FCB  file size  - 23H
OPEN            - 3DH
```

/X specifies the following additional system functions (int 21H):

```
FCB  search first - 11H
Find First        - 4EH
Exec program      - 4BH
```

> **Note:** APPEND cannot process EXEC calls when TopView is loaded.

See the PATH command in this Chapter, for additional information.

Purpose:

Instructs DOS to route disk I/O requests for one drive into disk I/O requests for another drive.

Format:

$[d:][path]$ASSIGN $[x[=] y [\ldots]]$

Type:

Internal External

***

Remark:

Specify the parameters:

$[d:][path]$ before ASSIGN to specify the drive and path that contains the ASSIGN command file.

x to specify the drive to which current disk I/O requests are sent.

y to specify the drive letter that you want disk I/O requests to now be sent.

The first drive letter x is internally converted by DOS to the second drive letter y. Both x and y must physically exist (a diskette, fixed disk or block device driver such as VDISK). Do not type the colon after the drive letters x and y.

Type ASSIGN with no parameters to reset all drive assignments so that normal drive assignments resume.

Note: This command has been included to assist you with applications that were designed

ASSIGN (Drive)
Command

to perform their disk operations specifically on drives A and B (those applications that do not allow you to specify a drive). By using a command such as the following way, those applications can be made to use drives other than A and B, such as a fixed disk.

```
assign a=c b=c
```

Reassignment of drives should *only* be used when necessary. It should never be used with the BACKUP, RESTORE, LABEL, JOIN, SUBST, or PRINT commands.

Also, do not reassign drives when running DOS in normal operations. Doing so can *hide* the true device type from commands and programs that require actual drive information. Note that FORMAT, DISKCOPY and DISKCOMP ignore any drive reassignments.

If you are developing application programs, we recommended that you avoid using specific drive assignments within your program. Instead, allow the user to specify the drives.

ASSIGN (Drive) Command

Examples:

The following example assigns all requests for drive A to drive C. Thus, if you issue **DIR A:**, DOS displays the directory that is on physical drive C:

```
assign a=c
```

The following example assigns any requests for drive A or drive B to drive C.

```
assign a=c b=c
```

The following example resets any previous drive assignments so that requests for drive A go to drive A.

```
assign
```

ATTRIB (Attribute) Command

Purpose:

Modifies file attributes for a single file, for selected files in a directory, or for all files in a directory level.

Format:

$[d:][path]$ATTRIB $[+R|-R][+A|-A]$ $[d:][path]$ *filename[.ext][/S]*

Type:

Internal External

***

Remark:

Specify the parameters:

$[d:][path]$ before ATTRIB to specify the drive and path that contain the ATTRIB command file.

$+R$ to set the read attribute of the specified file to read − only.

$-R$ to remove the read − only attribute of the specified file.

$+A$ to set the archive bit of the specified file.

$-A$ to reset (turn off) the archive bit of the specified file.

$[d:][path]$*filename[.ext]* to specify the file whose attribute you want to change. Global file name characters are allowed.

/S to process all files in the specified directory and its subdirectories.

Examples:

The following example sets the read – only attribute of the file name FILE1.TXT, and resets the archive bit.

```
attrib +r -a file1.txt
```

The following example displays the current setting of the archive bit and read-only attribute for the file FILE1.TXT.

```
attrib file1.txt
```

The result is:

```
R       A:\FILE1.TXT
```

The following example removes the read – only attribute from the file:

```
attrib -r file1.txt
```

The following example displays the current setting of the read – only attribute:

```
attrib file1.txt
```

The result is:

```
A:\FILE1.TXT
```

ATTRIB (Attribute) Command

The following example sets the attribute of the file
C:\PROG1.BAS to read – only.

```
attrib +r c:\prog1.bas
```

> **Note:** Changing the archive bit affects the
> operation of BACKUP /M, RESTORE /M,
> and XCOPY /M. If the archive bit is set, the
> file is copied; if the archive bit is not set, the
> file is not copied.

The following example resets the archive bit for all
files on the A drive.

```
attrib -a a:\*.* /s
```

> **Note:** When you want to perform a complete
> backup using the BACKUP /M or XCOPY /M
> command, you must first assure that all files to
> be backed up have the archive bit set. If the
> files exist in more than one directory, the /S
> parameter of ATTRIB can be used for this
> purpose.

The following command sets the archive bit of all the
files on drive C; the files are copied by the command
XCOPY C:*.* A: /S /M.

```
attrib +a c:\*.* /s
```

Purpose:

Backs up one or more files from one disk to another. The drive specifiers of the disks must be unique.

Format:

[*d:*][*path*]BACKUP *d:*[*path*][*filename*[.*ext*]] *d:* [/S] [/M][/A][/D:*mm-dd-yy*][/T:*hh:mm:ss*][/F][/L [:[*d:*][*path*]*filename*[.*ext*]]]

Type:

Internal External

***

Remark:

Specify the parameters:

[*d:*][*path*] before BACKUP to specify the drive and path that contain the BACKUP command file.

d: to specify the drive that contains the files you want to BACKUP (source).

[*path*][*filename*[.*ext*]] to specify the name of the file or files you want to BACKUP.

d: to specify the drive that will contain the backed up files (target).

/S to back up subdirectory files in addition to the files in the specified or current directory.

/M to back up files that have been modified since the last BACKUP.

BACKUP
Command

/A to add the files to be backed up to the files already present on the backup disk.

/D to back up files that have been modified on or after the specified date. The format of the date specified [*mm-dd-yy*] or [*dd-mm-yy*] or [*yy-mm-dd*] depends on the country code you selected using the SELECT or COUNTRY commands.

/T to back up files that have been modified on or after the specified time on the date specified. The format of the time specified depends on the country code.

/F to format the target diskette if it is not already formatted. BACKUP formats the target disk by executing the DOS FORMAT command. FORMAT should be accessible in the current directory or the path saved in the environment.

/L to create a log file. If a file name is not specified, the default is BACKUP.LOG, and the file is stored in the root directory of the source drive. If a log file exists, the information is appended to the end of that file. The first record of the file contains:

- Date of the backup
- Time of the backup.

Subsequent records contain:

- Diskette number of the backed up file.
- Full path and file name of each backed up file.

Notes:

1. Files can be backed up from:

   • A fixed disk to a diskette
   • A diskette to a diskette
   • A diskette to a fixed disk
   • A fixed disk to a fixed disk.

2. The disk that contains the file you want to back up is called the *source*. The disk where the backup file is placed is called the *target*.

3. Global file name characters are allowed in the file name and extension. By using global file name characters, you can back up all files (including subdirectory files) from a source drive to a target drive.

4. If you are sharing files, you can only **backup** files that you have access to. If you attempt to access a file that you do not have access to, the following message appears:

   ```
   PATHNAME\FILENAME.EXT
   Not able to backup file
   ```

5. If the target contains files, BACKUP erases the files already present in the root directory on the diskette or the BACKUP directory on a fixed disk unless you specify the /A parameter. To add files to an existing BACKUP diskette, you must specify the /A parameter.

6. If the source or target is removable, you are prompted to insert the source or target diskette in the drive.

BACKUP
Command

7. After BACKUP fills a diskette, you are prompted to insert a new diskette. Label each diskette and record the date and diskette number.

8. BACKUP displays the name of each file as it is backed up. Label each backup diskette in consecutive order because, when the files are restored, you are prompted to insert the backup diskettes in order.

9. The BACKUP command sets the exit code as follows:

   0 Normal completion

   1 No files were found to backup

   2 Some files not backed up due to file-sharing conflicts

   3 Terminated by user (Ctrl-Break)

   4 Terminated due to error

   These codes can be used with the batch processing IF ERRORLEVEL subcommand.

10. DOS 3.30 BACKUP stores backed up files more efficiently than DOS 3.20 BACKUP. BACKUP creates two files in the root directory on the target diskette called BACKUP.XXX and CONTROL.XXX. The BACKUP.XXX file will contain all the files chained together, and the CONTROL.XXX file will save paths, file names, and other controlling information.

11. If the source is a diskette, it should not be write-protected because BACKUP needs to reset the archive bit on the files backed up.

Do not use BACKUP with a drive letter that has been assigned or substituted because the true drive letter that BACKUP is using can be hidden.

Do not use BACKUP while a JOIN is in effect, because the tree structure may be invalid when you RESTORE.

12. Do not use the BACKUP command while APPEND is in effect.

Examples:

The following example backs up all files from the fixed disk drive C to the diskette in drive A:

```
backup c:\*.*  a:/s
```

Note: To back up a full 10MB fixed disk to double – sided, 9-sector diskettes, you need approximately 25 diskettes.

The following example backs up the file named FILE.TXT from drive A to drive C.

```
A>backup a:file.txt c:
```

The following example backs up all files modified on or after the date 8 – 21 – 84 in the current directory of drive A to drive C.

```
A>backup a: c:/d:8-21-84
```

The example below backs up all files from the root directory on drive C to drive A. If the diskette in drive A is unformatted, BACKUP formats the diskette before backing up any files.

```
A>backup c:\ a:/f
```

WARNING! When using the /F parameter, the target diskette capacity and the target drive capacity

BACKUP
Command

must be identical. For example, do not use a
320KB/360KB diskette in a 1.2MB diskette drive.

The following example backs up all files from drive
C and builds a log file called BACKUP.LOG in the
root directory on drive C.

```
A>backup c:\ b:/s /l
```

The following example adds the files on drive A to
the backed up files already on the diskette in drive B.

```
backup a: b:/a
```

Purpose:

Batch commands are DOS commands that are contained in a special file called a *batch* file. When you execute a batch file, DOS executes the commands you include in the batch file.

Format:

[d:][path]filename[.BAT] [parameters]

Type:

Internal External

***

Remark:

A batch file is a file containing one or more commands that DOS executes one at a time. All batch files must have a file name extension of .BAT.

You can pass parameters (using replaceable parameters) to the *filename*.BAT file when the file is executed. Therefore, the file can do similar work with different data during each execution.

You can create a batch file by using the Line Editor (EDLIN), or by using the COPY CON command directly from the standard input device.

Notes:

1. Do not enter the name BATCH (unless the name of the file you want to execute is BATCH.BAT).

2. Do not name batch files with internal command names.

Batch File Commands

3. You do not need to type the file name extension .BAT to execute a batch file.

4. If you remove a diskette containing a batch file being processed, DOS prompts you to insert it before the next command can be read.

5. The last command in a batch file may be the name of another batch file, allowing you to start one batch file from another when the first is finished. If one batch file refers to a second batch file, the second batch file does not return to the first batch file when it finishes, unless the first batch file used the CALL command to execute the second batch file.

6. DOS remembers which directory the batch file was started from. Therefore, the commands within the batch file may change the current directory during execution.

7. Batch files execute quickly if placed on a virtual disk. Refer to Chapter 4, "Configuring Your System," for information on virtual disks (VDISK.SYS).

8. All batch subcommands are executed at the command level (at the DOS prompt).

Creating a Batch File

You can create a batch file by using an editor or by using the COPY command directly from the standard input device. Follow these steps to create a batch file using the COPY command.

1. At the DOS prompt, type:

    copy con *filename*.bat

    Substitute the name you want for your batch file for *filename*.

2. Press Enter.

3. Type the commands you want to include in the batch file. Press Enter after you type each command.

    Note: If you make a mistake typing a command, press Ctrl – Break, then retype the command.

4. When you have finished press F6 then Enter, this ends the COPY command, saves the batch file and displays, this message:

    ```
    1 File(s) copied
    A>
    ```

Batch File Commands

Executing a Batch file

To execute a batch file, type the name of the batch file at the DOS prompt, then press Enter. You do not need to type the batch file name extension .BAT.

To stop execution of a batch file, press Ctrl – Break. The command being executed ends, and the following prompt is displayed:

Terminate batch job (Y/N)?

Type **y** to terminate execution of the batch file. Type **n** to continue executing the remaining commands.

The AUTOEXEC.BAT File

Every time you start DOS, the command processor searches for a file named AUTOEXEC.BAT in the root directory on the disk that DOS was started from. An AUTOEXEC.BAT file is a special type of batch file that is automatically executed when you start or restart DOS. An AUTOEXEC.BAT file is useful if you want to execute certain commands every time you start DOS. For example, you can create an AUTOEXEC.BAT file that sets the DOS path by including the PATH command in the file.

Creating an AUTOEXEC.BAT file

An AUTOEXEC.BAT file must be created in the root directory of the disk you start DOS from. You are not prompted for the date and time when you start DOS, unless you include the DATE and TIME commands in the AUTOEXEC.BAT file.

Creating a Batch File with Replaceable Parameters

Within a batch file you can include *dummy* parameters that can be replaced by values supplied when the batch file executes.

For example, if the batch file EXAMPLE.BAT contains these commands:

```
copy %1.mac %2.mac
type %2.prn
type %0.bat
```

the replaceable parameters %0, %1, and %2 are replaced sequentially by the parameters you supply when you execute the file. The replaceable parameter %0 is always replaced by the drive specifier, if specified, and the file name of the batch file. In the AUTOEXEC.BAT file, %0 is not set to any value.

Notes:

1. Up to 10 dummy parameters (%0 − %9) can be specified within a batch file. Additional parameters can be specified on a command line (see SHIFT subcommand).

2. If you want to use % as part of a file name *within* a batch file, you must specify it twice. For example, to specify the file ABC%.EXE, you must type ABC%%.EXE in the batch file.

Batch File
Commands

Executing a Batch File with Replaceable Parameters

To execute a batch file and pass parameters, type the batch file name followed by the parameters you want sequentially substituted for %1, %2, etc.

For example, you can type:

```
example a:prog1 b:prog2
```

EXAMPLE is substituted for %0, A:PROG1 for %1, and B:PROG2 for %2.

The result is the same as if you typed each of the three commands (in the EXAMPLE.BAT file) with their parameters from the console, as follows:

```
copy a:prog1.mac b:prog2.mac
type b:prog2.prn
type example.bat
```

Using Environment Variables

DOS environment variables (see the SET command) can be used in batch files in much the same way as replaceable parameters. Each environment variable is preceded with and followed by a %. For example, to refer to the DOS PATH value, enter %PATH%.

The following example assumes that a string defining a valid drive as "destination" exists in the environment (such as destination = c:).

```
echo got here >%destination%file1
```

The result of executing the above BATCH command is the string "got here" in file1 on the drive defined by "destination."

CALL Subcommand

Purpose:

Allows a batch file to be called from within another batch file without ending the first batch file. This allows batch files to be treated as a command in a batch file.

Format:

CALL [d:][path]filename

Type:

Internal External

***

Batch File Commands

Remark:

CALL can be used from any line inside of a batch file and is limited only by available memory. A batch file may call itself, but be careful to ensure the batch file eventually terminates.

Examples:

The following batch file calls the files ACCT.BAT and BILL.BAT, which process monthly accounts and sends out bills.

```
call acct
call bill
```

> **Note:** The CALL command should not be used with piping or redirection.

ECHO Subcommand

Purpose:

Allows or prevents the screen display of DOS commands executed from a batch file.

Format:

ECHO [ON|OFF|*message*]

Type:

Internal External

***

Remark:

When system power is turned on or the system power is reset, ECHO is on and displays all the commands on the standard output device as they are executed. If you specify ECHO OFF, commands displayed (including the REM command) are not.

If you specify ECHO *message*, a **message** is displayed on the standard output device whether ECHO is on or off state.

If ECHO is issued with no parameters, the existing ECHO state is displayed.

Examples:

To prevent DOS from interpreting a character, enclose it in double quotes as in the following example:

```
echo off
echo piping symbol "|"
echo redirect output ">"
```

To prevent a batch file line from being displayed, you can place a @ before the command.

Batch File Commands

For example:

```
@echo off
@rem This line will not display
rem This line will display
@file1
```

each line that is preceded by the "@" will not be displayed. Any other lines will be displayed. In this example, the batch file contains the following:

```
@echo off
rem **** command display is off
dir a:/w
@echo on
dir a:/w
```

In the above example, ECHO OFF is not displayed because of the @. The **rem** command and **dir a:/w** are not displayed because ECHO is OFF, but the output of the **dir** is still displayed. Then, **ECHO ON** is executed, and the command **dir a:/w** is displayed.

> **Note:** Executing a command beginning with the @ character results in a "File not found" message. If the command is preceded by another @ symbol, the command is executed.

When this batch file is executed, the following is displayed:

```
Volume on drive A has no label
Directory of A:\

FILE1.EXT  FILE2.EXT
2 file(s)   xxxxx bytes free
```

dir a:/w

```
Volume on drive A has no label
Directory of  A:\

FILE1.EXT   FILE2.EXT
2 file(s)   xxxxx bytes free
```

Batch File Commands

FOR Subcommand

Purpose:

Allows repetitive execution of DOS commands.

Format:

FOR %%*variable* IN (*set*) DO *command*

Type:

Internal External

***

Remark:

The *%% variable* is sequentially set to each member of *set* and then the *command* is evaluated and executed. If a member of *set* is an expression involving * and/or ?, then the *%% variable* is set to each matching file name from disk. Path names are allowed in *set*.

> **Note:** %% is required if the FOR command is included in a batch file. To type the FOR command at the DOS prompt, include one %. For example, you can type:

```
for %h in (file1) do dir
```

Examples:

In the following example, if you type the command:

```
for %%f in (prog1.asm prog2.asm prog3.asm) do dir %%f
```

the result is the same as if you typed the following three commands:

```
dir prog1.asm
dir prog2.asm
dir prog3.asm
```

> **Note:** FOR subcommands cannot be nested; that is, only one FOR subcommand can be specified on a command line.

Batch File Commands

GOTO Subcommand

Purpose:

Transfers control to the line following the one containing the appropriate label. A label is inserted in a batch file as a colon (:), followed by the label name.

Format:

GOTO [:]*label*

Type:

Internal External

***

Remark:

The GOTO *label* causes commands to be executed beginning with the line immediately after *:label*. If *:label* is not defined, the current batch file terminates with the message **Label not found**. A label in a batch file is defined as a character string where the first eight characters are significant. A label cannot contain a period (.).

Examples:

In the following example, the batch file produces an indefinite sequence of **rem looping . . .** and **goto loop** messages on the screen:

```
:loop
rem looping...
goto loop
```

Note that labels within a batch file are never displayed while the batch file is executing. In the example above, the line **:LOOP** would not be displayed. Thus, unreferenced labels provide a handy means for placing comments within your batch file that are not displayed when the file is executed.

Batch File Commands

IF Subcommand

Purpose:

Allows conditional execution of DOS commands.

Format:

IF [NOT] *condition command*

Type:

Internal External

***

Remark:

The *condition* parameter is one of the following:

ERRORLEVEL *number*

string1 = = *string2*

EXIST [*d:*][*path*]*filename* [*.ext*]

When the *condition* is true, then the DOS command is executed. Otherwise, the DOS command is skipped, and the next command in the file is executed.

ERRORLEVEL *number* is true if the previous program had an exit code of *number* or higher. The number is specified as a decimal value.

string1 = = *string2* is true when *string1* and *string2* are identical.

Note: The corresponding characters of *string1* and *string2* must both be uppercase or lowercase to be identical.

EXIST is true if *filename* is found in the specified directory. Global file name characters (? and *) are allowed in *filename*.

The NOT *condition* is true if the *condition* is false.

Examples:

This example is for:

IF EXIST [*d:*] [*path*]*filename*[*.ext*]

```
if exist file1 goto abc
.
.
.
:abc
command
```

Execution of this command in a batch file is true, provided FILE1 is found in the current directory on the default drive. The GOTO ABC is executed causing the system to skip to the command following the label :ABC. If FILE1 is not found, the GOTO ABC would not be executed. Processing would then continue with the next command in the batch file.

The following example is for:

IF *string1* = = *string2*

```
if %1 == JOHN echo John was here!
```

Execution of a batch file containing this command, with JOHN given as the **%1** parameter, would make the condition true. The ECHO batch command would then be executed displaying **John was here!** If JOHN was not given as the **%1** parameter, the condition would have been false. The ECHO batch command would not have been executed. Processing would continue with the next command in the batch file.

Batch File Commands

The following example is for:

IF ERRORLEVEL *number*

```
myprog1
if errorlevel 1 echo myprog1 failed
```

The above two commands are in a batch file;
MYPROG1 is a program that sets the errorlevel
when it completes its processing. In the simple case,
MYPROG1 sets the errorlevel to 0 if it completed
processing successfully and sets errorlevel to 1 if
processing completed unsuccessfully. The batch file
conditional **if errorlevel 1 echo ...** tests for the
situation when MYPROG1 failed. If MYPROG1
completed processing unsuccessfully, the condition is
true and the ECHO batch command is executed.
The ECHO batch command displays the data (or
message) immediately following *echo*. If MYPROG1
was successful, the condition would not be true and
the ECHO batch command would not be executed.
Processing would then continue with the next
command in the batch file.

The following example is for:

IF NOT EXIST [*d:*][*path*]*filename*[*.ext*]

```
if not exist a:%1 copy b:%1 a:
program
```

The batch file that contains this command is going to execute a program that requires a particular file to be on drive A. The IF command is executed prior to the program to make sure that the required file is on drive A. If the file does not exist on drive A, the condition is true. The COPY command is then executed, copying the file from drive B to drive A to satisfy the requirements of the program. If the file does exist on drive A, the copy is not executed. Processing then continues to execute the program.

Note: Refer to each command description to determine if the command sets an ERRORLEVEL that can be tested.

Batch File Commands

PAUSE Subcommand

Purpose:

Suspends system processing and displays the message **Strike a key when ready....**

Format:

PAUSE [*remark*]

Type:

Internal External

***

Remark:

You can insert PAUSE commands within a batch file to give you the opportunity to change diskettes between commands. To resume execution of the batch file, press any key *except* Ctrl – Break. (Ctrl – Break ends processing).

If you include the optional *remark*, the remark is also displayed (if echo is on). The optional remark can be any string of characters up to 121 characters long.

You can control how much of a batch file you want to execute by placing PAUSE commands at strategic points in the file. At each PAUSE command, the system stops and gives you time to decide whether to end processing. To end processing, press Ctrl – Break and then type **y.** To continue processing, press **n.**

Examples:

For example:

```
echo on
pause Change diskette in drive a
```

with the above commands in a batch file, the
following message is displayed:

```
pause Change diskette in drive A
Strike a key when ready..._
```

This PAUSE enables you to change diskettes between
commands.

Batch File Commands

REM (Remark) Subcommand

Purpose:

Displays remarks from within a batch file. Adds remarks or line spacing in a batch file.

Format:

REM [*remark*]

Type:

Internal External

***

Remark:

The *remarks* are displayed when the batch execution reaches the REM command. If ECHO is OFF, then the remarks are not displayed. Remarks can be any string of up to 123 characters. You can use REM commands without remarks for spacing within your batch file, for readability.

Examples:

The following example, displays a REM command and a string of characters in a Batch file.

```
rem This is the daily checkout program
```

To prevent DOS from interpreting characters, enclose them in double quotes.

Examples:

Only the first line will cause a directory listing.

```
rem May not want to pipe to ¦ dir
rem Use double quotes "¦"
```

SHIFT Subcommand

Purpose:

Allows command lines to make use of more than 10 (%0 through %9) replaceable parameters.

Format:

SHIFT

Type:

Internal External

***

Remark:

Replaceable parameters are numbered %0 through %9. If you wish to use more than 10 replaceable parameters on a command line, you can use SHIFT to get at parameters past the tenth. All parameters on the command line are shifted one position to the left, with the %0 parameter being replaced by the %1 parameter, etc.. Each subsequent shift command causes all the parameters to be shifted to the left by one position. For example:

%0 = A
%1 = B
%2 = C
%3 = D
.
.
.
%9

Batch File Commands

The SHIFT results are:

%0 = B
%1 = C
%2 = D
.
.
.
%9

Examples:

This example demonstrates how the SHIFT subcommand can be used in a batch file. If a batch file named MYFILE.BAT contains the following commands, and the default drive is A:

```
echo %0 %1 %2 %3
shift
echo %0 %1 %2 %3
shift
echo %0 %1 %2 %3
shift
echo %0 %1 %2 %3
shift
echo %0 %1 %2 %3
```

Start the batch file with the following parameters:

```
MYFILE    PROG1    PROG2    PROG3
```

The result is:

```
A>echo MYFILE    PROG1    PROG2    PROG3
MYFILE    PROG1    PROG2    PROG3

A>shift

A>echo PROG1    PROG2    PROG3
PROG1    PROG2    PROG3

A>shift

A>echo PROG2    PROG3
PROG2    PROG3

A>shift

A>echo PROG3
PROG3
A>shift
A>echo

A>
```

BREAK (Control Break) Command

Purpose:

Allows you to instruct DOS to check for a control break whenever a program requests DOS to perform any functions.

Format:

BREAK [ON | OFF]

Type:

Internal External

***

Remark:

Specify the parameters:

ON to set BREAK = ON. This means that DOS checks for Ctrl − Break whenever it is requested. This allows you to *break − out* of a program that produces few or no standard device operations.

OFF to set BREAK = OFF. This means that DOS only checks for Ctrl − Break during:

• Standard input operations

• Standard output operations

• Standard print device operations

• Standard auxiliary device operations

BREAK (Control Break) Command

The default value is set at BREAK **OFF**.

If you type BREAK with no parameters, the current state of the BREAK command (**ON** or **OFF**) is displayed.

You can also turn on the extended checking by using BREAK = ON in your configuration file. Refer to "Configuration Commands" in Chapter 4.

CHCP (Change Code Page) Command

Purpose:

Selects the code page that DOS will use and selects that code page for as many devices as possible. This is a system level command, while MODE is a device level command.

Format:

CHCP [*nnn*]

Type:

Internal External

***

Remark:

Specify the parameters:

[*nnn*] to specify the desired code page. If omitted, the operating system code page is displayed.

Notes:

1. The NLSFUNC command must be loaded prior to issuing the CHCP command. See the NLSFUNC command in this chapter.

2. If a device driver has not been prepared for the requested code page, CHCP cannot select the code page for that device. Refer to the MODE command in this chapter.

3. This command may need to access the
   COUNTRY.SYS file. If the file cannot be
   found, a **File not found** message is displayed.
   Using the COUNTRY= statement in the
   CONFIG.SYS file or the NLSFUNC command,
   you can tell DOS where to find COUNTRY.SYS.

For information on code page switching, see Chapter
9.

CHDIR (Change Directory) Command

Purpose:

Changes the DOS current directory of the specified or default drive, or displays the current directory path of a drive.

Format:

CHDIR [d:][path]

or

CD [d:][path]

Type:

Internal External

***

Remark:

Specify the parameters:

[d:] to specify the drive specifier of the disk whose current directory you want to change or display.

[path] to specify the desired directory path name. The path name cannot be more than 63 characters starting from the root directory.

DOS looks in the current directory to find files whose names are entered without specifying a path. If you do not specify a drive, the default drive is assumed.

Type **CHDIR** or **CD** with no parameters to display the current directory path of the default drive.

Examples:

The following example changes the current directory of the default drive to its root directory:

```
chdir \
```

The following example displays the current directory path of drive B.

```
cd b:
```

The following example changes the current directory of drive B to the path \LEVEL1\LEVEL2.

```
cd b:\level1\level2
```

The following example changes the directory of drive B to the current directory path plus LEVEL3:

```
cd b:level3
```

Thus, if the second example is used, the resultant path would be:

```
\LEVEL1\LEVEL2\LEVEL3
```

The search for the LEVEL3 directory begins in the directory that was current when the command was issued, because no leading backslash (\) was used.

CHDIR (Change Directory) Command

The following example changes the current directory of drive B to \LEVEL1.

```
cd b:\level1
```

The leading backslash (\) tells DOS to start at the root directory. DOS remembers the current directory for each drive on the system, and any reference to a drive will access the current directory.

Important: The true directory can be hidden by ASSIGN, SUBST, and JOIN. The following example describes a method of using C: while actually on A:.

```
join c: a:\cdrive
cd \cdrive
dir
```

Purpose:

Analyzes the directories, files, and the File Allocation Table on the designated or default drive and produces a disk and memory status report.

Format:

[d:][path]CHKDSK
[d:][path][filename[.ext]][/F][/V]

Type:

Internal External

***

Remark:

Specify the parameters:

[d:][path] before CHKDSK to specify the drive and path that contains the CHKDSK command file.

[d:][path][filename[.ext]] to specify the file name. If you specify a file name, CHKDSK displays the number of noncontiguous areas occupied by the file or files.

/F to have CHKDSK fix errors that are found in the directory or file allocation table. The corrections are written on the disk. If /F is not specified, CHKDSK functions as though it were preparing to correct the disk so that you can analyze the possible results of correction, but does not write the corrections to the disk. When you have subdirectories that cannot be reached, you get the message **Cannot CHDIR to d:path, tree past this point not processed.** If this occurs, CHKDSK does not free any allocation units on the disk.

CHKDSK (Check Disk) Command

/V to display all files and their paths on the default or specified drive.

After checking the disk, CHKDSK displays any error messages, followed by a status report. A complete listing of error messages can be found in Appendix A of this book.

CHKDSK does not wait for you to insert a diskette. It assumes that the diskette you want to check is in the specified drive. Therefore, on a one–diskette drive system, it is especially important that the specified drive is different from the default drive, unless you are checking the DOS diskette itself.

You should run CHKDSK occasionally for each disk to ensure the integrity of the file structures.

Notes:

1. All yes or no **(Y/N)** prompts from CHKDSK require you to press Enter after typing **y** or **n**, to prevent accidental changes to your disk.

2. If you specified a file name, the number of non–contiguous areas occupied by the file will be reported. Badly fragmented files (many non–contiguous areas) can cause system performance to slow down when those files are accessed, since DOS cannot read them sequentially. You can determine the extent of file fragmentation by using *.* in the file name field of the CHKDSK command.

3. If CHKDSK finds *lost* allocation units (clusters) on the disk, it asks if you wish to recover the lost data into files. If you say yes, and the /F parameter was used, CHKDSK recovers each chain of lost allocation units into a file whose name is in the form:

CHKDSK (Check Disk) Command

FILE*nnnn*.CHK

Where *nnnn* is a sequential number starting with 0000. These files are created in the root directory of the specified drive. You can then look at these files to see if they have any useful information. If not, you can erase them.

4. If you redirect CHKDSK's output to a file, for example:

    ```
    A>chkdsk b:>file
    ```

    It will report errors to that file. In this case, be sure not to use the **/F** parameter.

5. CHKDSK does not work on network drives (even if only logging messages) or drives involved in a substitution (SUBST) or JOIN.

Examples:
Following is an example CHKDSK status report:

```
Volume MYDISK       Created AUG 12, 1984 10:00

    179712 bytes total disk space
     18944 bytes in 3 hidden files
       512 bytes in 1 directories
     26112 bytes in 4 user files
    134144 bytes available on disk

    196608 bytes total memory
    170736 bytes free
```

Note that in this status report, *three hidden* files were reported. These are the volume label, and the DOS system files IBMBIO.COM and IBMDOS.COM, that are hidden from the normal directory searches. Some application programs also create hidden files.

CHKDSK (Check Disk) Command

The following example produces a CHKDSK status report for the diskette in drive A.

```
chkdsk a:
```

The following example produces a CHKDSK status report for the diskette in drive A and fixes any errors found in the directory or the file allocation table.

```
chkdsk a:/f
```

The following example produces a CHKDSK status report for the diskette in drive A and displays all the files and their paths on drive A.

```
chkdsk a:/v
```

The following example produces a CHKDSK status report for disk drive C and lists the file names on drive C that contain non – contiguous areas.

```
chkdsk c:*.*
```

In the previous example, if the files FILE1, FILE3, and FILE6 contain non – contiguous blocks, CHKDSK would display these messages:

```
C:\FILE1
    Contains 2 non-contiguous blocks
C:\FILE3
    Contains 2 non-contiguous blocks
C:\FILE6
    Contains 2 non-contiguous blocks
```

Purpose:

Clears the display screen.

Format:

CLS

Type:

Internal External

***

Remark:

This command clears the display on the standard output device. If screen attributes have been selected using the "Using Extended Screen and Keyboard Control" functions in Chapter 3 of the *DOS Technical Reference*, the attributes remain unchanged.

COMMAND (Secondary Command Processor) Command

Purpose:

Start a secondary command processor.

Format:

COMMAND [*d:*][*path*][/P][/C *string*] [/E: *xxxxx*]

Remark:

Specify the parameters:

[*d:*][*path*] is the drive and path that DOS searches to find the command processor you want to start. If a COMMAND.COM is not found in the specified directory, DOS searches the path in your environment for it. COMMAND.COM loads the transient portion from the file specified in COMSPEC= as part of its initialization.

/P causes the copy of the new command processor to become permanent in memory. If you specify /P, the second command processor does not return to the primary command processor. You must restart DOS to remove the second command processor.

[/C *string*] allows you to pass a *string* and then automatically exit back to the primary command processor after the command is completed.

string is a command that you want to pass to the command processor. The command is interpreted and acted upon as if you had typed it at the DOS prompt. For example, if you type:

```
command /c dir b:
```

a secondary command processor is loaded, and it executes the command **dir b:** and then exits back to the primary command processor.

/E:*xxxxx* is a base 10 integer that you specify to set the size of the environment. This number must be in the range of 160 to 32768. It is rounded up to the nearest paragraph boundary.

Note: The integer value is rounded up, not down.

Issuing COMMAND without any parameters causes a new copy of the command processor to be loaded, and this new copy will inherit the environment known to the previous level of the command processor. If you use the SET command to change the environment known to the secondary command processor, that change is known *only* to the secondary copy. Exiting back to the primary command processor causes a resumption of the environment that the primary command processor knew before the secondary copy existed.

If you specify the /P and /C parameters together, then the /P parameter is ignored.

COMMAND (Secondary Command Processor)
Command

Examples:

Let's assume that the primary command processor used the normal DOS prompt of **ng** (which is the default prompt). If you start a secondary copy of the command processor, the secondary copy "inherits" that prompt. If you change the secondary's prompt to something else, and then you exit back to the primary, the primary's prompt will still be **ng**.

When a secondary command processor is loaded with no parameters specified, you can cause it to return to the previous level of command processor by issuing the special command **EXIT**.

> **Note:** Application programmers: please refer to Chapter 7 of *DOS Technical Reference* for additional information.

Purpose:

Compares the contents of the first set of specified files to the contents of the second set of specified files.

Note: This command compares two sets of *files*; the DISKCOMP command compares two *entire diskettes*.

Format:

[*d:*][*path*]COMP [*d:*][*path*][*filename*[*.ext*]] [*d:*][*path*][*filename*[*.ext*]]

Type:

Internal External

***

Remark:

Specify the parameters:

[*d:*][*path*] before COMP to specify the drive and path that contains the COMP command file.

[*d:*][*path*][*filename*[*.ext*]] to specify the first set of file names that you want to compare. It is also referred to as the *primary* file.

[*d:*][*path*][*filename*[*.ext*]] to specify the second set of file names that you want to compare. It is also referred to as the *secondary* file.

COMP (Compare Files) Command

Notes:

1. The files that you compare may be on the same drive or on different drives. They can also be in the same directory or different directories.

2. If no parameters are specified with the COMP command, or if the second parameter is missing, you are prompted for them. If either parameter contains only a drive or a path with no file name, COMP assumes a file name of *.*. You can enter a complete path with either of the two file names.

3. If no file matches the primary file name, COMP will prompt you for both the primary and secondary parameters again.

4. During the comparison, an error message appears for any location that contains mismatching information in the two files. The message indicates the offset into the files of the mismatching bytes, and the contents of the bytes themselves (all in hexadecimal), as follows:

```
Compare error at OFFSET XXXXXXXX
File 1 = XX
File 2 = XX
```

In this example, FILE1 is the first file name typed; FILE2 is the second file name typed.

After ten unequal comparisons, COMP concludes that further comparing would be useless; processing ends, and the following message is displayed:

```
10 Mismatches - ending compare
```

After a successful comparison, COMP displays:

```
Files compare OK
```

After the comparison of the two files ends, comparing will proceed with the next pair of files that match the two file names, until no more files can be found that match the first parameter. Then COMP displays:

```
Compare more files (Y/N)?_
```

You now have the option to compare two more files or to end the comparison. If you want to compare two more files, enter **y**. You will be prompted for new primary and secondary file names.

If you want to end COMP processing, type **n**. You will return to the DOS prompt.

5. In all compares, COMP looks at the last byte of the files being compared to assure that it contains a valid end – of – file mark (Ctrl – Z, which is the hexadecimal character 1A). If found, no action is taken by COMP. If the end – of – file mark is *not* found, COMP produces the message:

```
EOF mark not found
```

This is done because some products produce files whose sizes are always recorded in the directory as a multiple of 128 bytes, even though the actual usable data in the file is usually a few bytes less than the directory size. In this case, COMP may produce **compare error** messages when comparing the few bytes beyond the last real data byte in the last block of 128 bytes (COMP always compares the number of bytes reflected in the directory). Thus, the **EOF mark not found** message indicates

COMP (Compare Files) Command

that the compare errors may not have occurred in the usable data portion of the file.

6. A comparison does not take place if the file sizes are different.

7. COMP does not wait for you to insert a diskette containing a file to be compared. Therefore, if a file to be compared is not on the same diskette as the COMP command itself, you should type COMP with no parameters. When COMP prompts for the file names, you can insert the desired diskette and reply with the name of the file to be compared.

Examples:

The following example compares all .ASM files on drive B with the files on drive C with the same file names.

```
comp b:*.asm c:
```

The following example compares all files in the directory A:\LEVEL1 with corresponding files in the directory A:\LEVEL2.

```
comp a:\level1 a:\level2
```

Purpose:

Copies one or more files to the specified disk.

Format:

COPY [/A][/B][*d:*][*path*]*filename*[*.ext*][/A][/B]

[*d:*][*path*][*filename*[*.ext*]][/A][/B][/V]

or

COPY [/A][/B][*d:*][*path*]*filename*[*.ext*][/A][/B]

[+ [*d:*][*path*]*filename*[*.ext*][/A][/B] . . .]

[*d:*][*path*][*filename*[*.ext*]][/A][/B][/V]

Type:

Internal External

***

Remark:

The first file specified is the source file. The second file specified is the target file. If the second parameter is a directory (*path* with no file name), files are copied into that directory without changing their names.

> **Note:** COPY is not the same as BACKUP. Use BACKUP or XCOPY if you want all files including subdirectories. COPY only copies files from the current or specified directory.

COPY also copies files to the same disk. In this case, you *must* give the copies different names unless different directories are specified; otherwise, the copy

COPY
Command

is not permitted. Concatenation (combining of files) can be performed during the copying process.

You can also use COPY to transfer data between any of the system devices. An example of how to copy information that you type at the keyboard to a file is provided at the end of the description of COPY Option 2.

Specify /V to cause DOS to verify that the sectors written on the target diskette are recorded properly. Although errors in recording data are very rare, this option has been provided for those of you who wish to verify that critical data has been correctly recorded. This option causes the COPY command to run more slowly, due to the additional overhead of verification.

The /V parameter provides the same check as does the VERIFY ON command. /V is redundant if the VERIFY ON command has been executed previously. The difference is that /V is effective only during the duration of the COPY command. The VERIFY ON command is in effect until VERIFY OFF is entered.

The parameters /A and /B indicate the amount of data to be processed by the COPY command. Each applies to the filespec preceding it and to all remaining filespecs on the command line until another /A or /B is encountered. These parameters have the following meanings:

When used with a *source* filespec:

/A Causes the file to be treated as an ASCII (text) file. The file's data is copied up to, but not including, the first end – of – file character (Ctrl – Z, which is 1AH) found in the file the remainder of the file is not copied.

/B Causes the entire file (based on the directory file size) to be copied.

When used with a *target* filespec:

/A Causes a Ctrl – Z character to be added as the last character of the file.

/B Causes no end – of – file character (Ctrl – Z) to be added.

The default values are **/A** when concatenation is being performed (see Option 3 below), and **/B** when concatenation is not being performed (Options 1 and 2).

Notes:

1. When copying to or from a reserved device name, the copy is performed in ASCII (**/A**) mode. The first Ctrl – Z character encountered will end the copy unless **/B** was specified.

2. If you make a copy of a file that is marked read – only, the copy will not be marked read – only.

3. You cannot use COPY to transfer a file between computers using serial ports.

You can use the global characters **?** and ***** in the file name and in the extension parameters of both the

COPY
Command

source and target files. If you type a **?** or ***** in the source *filespec*, the names of the files will be displayed as the files are being copied. For more information about global characters, refer to "Global File Name Characters" in Chapter 2.

The COPY command has three format options:

Option 1 - Copy with Same Name

Use this option to copy a file with the target file having the *same* file name and extension as the source file. For example:

COPY [*d:*][*path*]*filename*[*.ext*]

or

COPY [*d:*][*path*]*filename*[*.ext*] *d:*[*path*]

In the first example, we want to copy a file to the current directory of the default drive. In the second example, we specify the target drive and/or directory. In both examples, because we did not specify the second file name, the copied file will have the same file name as the source file. Because we did not specify a name for the second file, the source drive and the target drive must be different unless different directories were specified or implied; otherwise, the copy is not permitted.

For example, assume the default drive is A. The command:

```
B>copy b:myprog
```

copies the file MYPROG from drive B to the current directory on the default drive A, with no change in the file name.

The command:

```
A>copy *.* b:
```

copies all the files in the current directory from the default drive A to drive B, with no change in the file names or in the extensions. The file names are displayed as the files are copied. This method is very useful if the files on drive A are fragmented. The command:

```
A>copy b:\myprog    b:\level1
```

copies the file MYPROG from the root directory of drive B to the directory path:

```
\level1
```

on the same drive. The copy has the same file name as the original file. Note that the above example assumes that directory \LEVEL1 exists on drive B. If it did not, then the file MYPROG would have been copied into a file named LEVEL1 in the root directory of drive B. In other words, if the second parameter specifies a directory that exists, the file (or files) will be placed in that directory, keeping the same file name. If the second parameter does not specify a directory that exists, DOS will treat it as a file name.

COPY
Command

Option 2 - Copy with Different Name

Use this option when you want the copied file to
have a different name from the file being copied.
For example:

COPY [*d:*][*path*]*filename*[*.ext*][*path*]
filename[*.ext*]

   or

COPY [*d:*][*path*]*filename*[*.ext*] *d:*[*path*]
filename[*.ext*]

In the first example, we copied a file (first file
specified), and renamed the copy (second file
specified). We did not specify a drive, so the default
drive was used. In the second example, we copied a
file and renamed the copy also. In this example, we
did specify the target drive. Because we changed the
name of the file, the source drive and the target drive
do not have to be different. The current directory
can be the same or different.

For example:

```
A>copy myprog.abc b:*.xxx
```

copies the file MYPROG.ABC from the diskette in
the default drive to drive B, naming the copy
MYPROG.XXX. The current directory of each
drive was used.

You can also use reserved device names for the copy operation. For example:

```
copy con filea
copy con aux
copy con lpt1
copy filea con
copy fileb aux
copy filec lpt2
copy aux lpt1
copy aux con
```

Also, NUL can be used in any variation.

Refer to "DOS Device Names" in Chapter 2 for information about system devices.

This example shows how to use COPY to put what you type from the keyboard into a file:

```
copy con filea

Type a line and press Enter.
Type your next line and press Enter.
.
.
.
Type your last line and press Enter.
Now, press F6 and then press Enter.
```

When you press F6, and then press Enter, the COPY operation ends and saves the information you entered. In this example, the information is saved in a file named FILEA.

> **Note:** This example assumes that you have not altered the meaning of F6 through the "Extended Screen and Keyboard Control" functions described in Chapter 3 of the *DOS Technical Reference*. If you have, then substitute the key that you have assigned Ctrl − Z for F6 in this example.

COPY
Command

Option 3 - Copy and Combine Files.

Use this option when you want to combine files
while copying. That is, you can combine two or
more files into one file by adding the additional files
to the end of the first. The message indicating the
number of files copied refers to the number of result
files created.

To combine files, list any number of source files,
separated by plus (+) signs in the COPY command.
Use the following format:

COPY [/A][/B][*d:*][*path*]*filename*[.*ext*][/A][/B]

[+ [*d:*][*path*]*filename*[.*ext*][/A][/B] . . .]

[*d:*][*path*][*filename*[.*ext*]][/A][/B][/V]

For example:

```
copy a.xyz+b.abc+b:c.txt bigfile.txt
```

This command creates a new file called
BIGFILE.TXT in the current directory of the default
drive. The combination of A.XYZ, B.ABC, and
B:C.TXT is put into BIGFILE.TXT.

If you do not specify a resultant *filename*, the
additional files are added to the end of the first file
(assuming the first file already exists), leaving the
result in the first file. For example,

```
copy a.asm+b.asm
```

In this case, COPY appends B.ASM to the end of
A.ASM and leaves the result in a file called A.ASM
in the current directory of the default drive.

Note: Combining files is normally performed in text (or ASCII) mode. That is, the first Ctrl − Z (hex 1A) character in the file is interpreted as an end − of − file mark. To combine binary files, use the **/B** parameter to force COPY to use the physical end − of − file (the file length shown in the DIR command).

You can also combine ASCII and binary files by using the following parameters:

- ASCII - /A

- Binary - /B

For example,

```
copy a.xyz+b.com/b+b:c.txt/a bigfile.txt
```

A **/A** or **/B** takes effect on the file it is placed after, and it applies to all subsequent files on the command line until another **/A** or **/B** is found. A **/A** or **/B** on the result file causes a Ctrl-Z to be added (/A), or not to be added (/B), as the last character in the result file.

You can use the global characters ? and * in the file names of both the files to be combined and the result file. For example:

```
copy  *.lst combin.prn
```

In this example, all files matching *.LST are combined into one file called COMBIN.PRN in the current directory of the default drive.

COPY
Command

The following example:

```
copy *.lst+*.ref combin.prn
```

combines all files matching *.LST and then all files matching *.REF into one file called COMBIN.PRN in the current directory of the default drive.

In the following example:

```
copy *.lst+*.ref *.prn
```

each file matching *.LST combines with the corresponding .REF file, with the result having the same name but with extension .PRN. Thus, a file FILE1.LST would be combined with FILE1.REF to form FILE1.PRN; XYZ.LST would be combined with XYZ.REF to form XYZ.PRN; etc. Note that in this case (when multiple files are to be created), only one file from each of the source filespecs is used to create a given target file.

For more information about global characters, refer to "Global File Name Characters" in Chapter 2.

It is easy to enter a COPY command to combine files where one of the source files is the same as the target, yet this often cannot be detected. For example:

```
copy *.lst all.lst
```

This would produce an error unless ALL.LST already exists as the first file with extension .LST or is added to the directory as the first .LST file. The error would not be detected, however, until it was time for ALL.LST to be appended; by this time, ALL.LST could already have been altered.

COPY handles this situation as follows. As each input file is found, its name is compared with the target file name. If the names are the same, that one input file is skipped, and the following message is displayed on the screen:

Content of destination lost before copy

Further copying proceeds normally. This allows *summing* files, with a command like:

```
copy all.tmp + *.lst
```

This command appends all .LST files, to ALL.TMP. In this case, the error message is suppressed, because this is a true *physical append* to ALL.TMP.

> **Note:** When combining files, COPY considers the copying process to be successful if at least one, but not necessarily all, of the named source files is found. If none of the source files can be found, you receive the message

```
0 file(s) copied
```

CTTY (Change Console) Command

Purpose:

Changes the standard input and output console to an auxiliary console, or restores the keyboard and screen as the standard input and output devices.

Format:

CTTY *device − name*

Type:

Internal External

***

Remark:

Specify the parameter:

device − name to define the device to use as the primary console. Specify AUX, COM1, COM2, COM3, or COM4 to use that device as the primary console. Specify CON to reset the primary standard input and output devices to the primary console.

Notes:

1. The CTTY command accepts the name of *any* character − oriented device to allow you to install your own device drivers, and to specify their device names. You must be certain that the named device is capable of both input and output operations. For example, you should not specify the name of a printer, because DOS will attempt to read from that device.

2. The CTTY command is effective only for programs that use DOS function calls. Other programs, such as BASIC (that do not use DOS function calls), are not able to use the CTTY command to change the standard input and output devices. Therefore, if you load BASIC while you are using CTTY, the standard input and output console are reset to the keyboard and screen.

Examples:

The following example causes DOS to use the AUX device for its standard input and output operations:

```
A>ctty aux
```

The following example reverses the previous assignment, causing DOS to switch back to the standard screen and keyboard for its operations:

```
A>ctty con
```

DATE
Command

Purpose:

Permits you to enter or change the date known to the system. Whenever you create or add to a file, the date is recorded in the directory. You can change the date from the console or from a batch file. On machines with permanent clocks, the clock date is also changed.

Format:

DATE [*mm-dd-yy*]|[*dd-mm-yy*]|[*yy-mm-dd*]

Type:

Internal External

***

Remark:

Specify the parameters:

mm to specify the month. Type one or two numbers from 1 to 12 for the month.

dd to specify the day. Type one or two numbers from 1 to 31 for the day.

yy to specify the year. Type two numbers between 80 and 99 or four numbers between 1980 and 1999 for the year.

Notes:

1. If you type DATE with no parameters, the
    following prompt is displayed:

    ```
    Current date is day mm-dd-yy
    Enter new date (mm-dd-yy):_
    ```

    The format for the date (mm-dd-yy or dd-mm-yy
    or yy-mm-dd) depends on the country you
    selected with the SELECT command. You also
    can change the format for the date by creating a
    CONFIG.SYS file that contains the COUNTRY
    command. Refer to Chapter 4, "Configuring
    Your System" for more information on the
    COUNTRY command.

2. Separate the parts of the date with a dash (-), a
    slash (/) or a period (.). For example, to set the
    date to September 23, 1984, type:

    ```
    9-23-84
    ```

    or

    ```
    9/23/84
    ```

    or

    ```
    9.23.84
    ```

3. If you type a valid date, the new date is accepted
    and the DOS prompt is displayed. If the date is
    invalid, the following prompt is displayed:

    ```
    Invalid date
    Enter new date (mm-dd-yy):_
    ```

DATE
Command

4. DOS displays the day of the week (Tue for example) for information purposes only. Do not include the day of the week when you type the date.

5. You can change the date from the standard input device or from a batch file. Remember, when you start the system, it does not prompt you for the date if you use an AUTOEXEC.BAT file. You can include a DATE command in that file. For more information about the AUTOEXEC.BAT file, refer to "Batch File Commands" in this chapter.

6. To leave the date as-is, press Enter.

Examples:

The following example changes the date to July 24, 1984.

```
A>date
Current date is Mon  1-18-1984
Enter new date: 7/24/84_
```

Purpose:

Deletes the specified file.

Format:

DEL [*d:*][*path*]*filename*[*.ext*]

Type:

Internal   External

***

Remark:

Specify the parameters:

[*d:*] to specify the drive that contains the file you want to delete.

[*path*] to specify the directory path that contains the file you want to delete.

filename[*.ext*] to specify the name of the file you want to delete.

Notes:

1. If the drive specifier is not specified, the default drive is assumed.

2. If the path is not specified, the current directory is assumed.

3. If you specify only the drive and path and omit the file name, all files in the specified directory will be deleted.

DEL (Delete)
Command

4. You can use the global file name characters ? and * in the file name and extension. However, use global file name characters with caution because multiple files can be deleted with a single command.

> **Note:** Before using the DEL command with the global file name characters in place of the file name or extension, obtain a list of the files to be deleted using the DIR command.

5. If you use the filespec *.* to delete all the files on a disk, the following message is displayed to verify that you actually want to delete all files:

```
Are you sure (Y/N)?
```

Type **y** (yes) and press Enter if you *do* want to delete all the files on the disk.

Type **n** (no) and press Enter if you do not want to erase all files on the disk.

6. You cannot delete files that are marked as read — only.

7. You cannot use DEL to delete a subdirectory. To delete a subdirectory, use the RMDIR (remove directory) command.

8. Extra care should be exercised when using DEL after using ASSIGN, JOIN, or SUBST.

DEL (Delete) Command

Examples:

The following example deletes the file name FILE.BAT from the diskette in drive A.

```
del a:file.bat
```

The following example deletes all files from the directory \LEVEL1 on drive C.

```
del c:\level1
```

DIR (Directory)
Command

Purpose:

Lists either all the directory entries, or only those for specified files.

Note: Directory entries for hidden system files such as IBMBIO.COM and IBMDOS.COM are not listed, even if present.

Format:

DIR [*d:*][*path*][*filename*[.*ext*]][/P][/W]

Type:

Internal External

***

Remark:

Specify the parameters:

[*d:*][*path*][*filename*[.*ext*]] to specify the file whose directory you want to list.

/**P** to pause the display when the screen is full. The following prompt is displayed:

Strike a key when ready . . .

Press any key to continue.

/**W** to display the information in a wide display format. Only the file names and directory names are shown. This parameter is only recommended for 80-column displays.

Notes:

1. The information provided in the directory listing includes the volume identification and the amount of free space left on the disk. The freespace amount is rounded up to the nearest 1024 bytes. The display line for each file includes its size in decimal bytes and the date and time the file was last written to.

   Note: If you set the COUNTRY configuration command to a country other than U.S., the date and time format displayed may be different. The examples in this section show the date displayed for the U.S. date and time format.

2. Entries that name other directories are clearly identified with < DIR > in the file size field.

3. You can use the global characters ? and * in the file name and extension parameters. For more information about the global characters, refer to "Global File name Characters" in Chapter 2.

4. If you do not specify a file name extension, the default is *.

5. To display the directory entry for a file that does not have an extension, type the file name followed by a period. In this case, the *.ext* does not default to *.

DIR (Directory) Command

6. The DIR command has two format options (the /P and /W parameters may be used with either option):

   • List All Files

   or

   • List Selected Files

7. In some instances, the speed at which DIR displays entries may be increased by specifying three or more buffers in the BUFFERS = command in the CONFIG.SYS file. Refer to the "BUFFERS Command" section in Chapter 4.

Examples:

Option 1 - List All Files

The following example lists all the directory entries on the default drive.

```
A>dir
```

The directory may look like this:

```
Volume in drive A is MYDISK
Directory of  A:\

FILE1   A         10368      7-20-83   12:13p
FILE3   A          1613      5-27-83   12:14p
9X                   31      8-17-82   10:59a
LEVEL2     <DIR>              9-09-82   12:10p
FILE1              2288      9-02-82   12:25p
        5 File(s) 141312 bytes free
```

The following example lists all the directory entries for current directory of drive C.

```
A>dir c:
```

The following example lists all the directory entries for the directory path \LEVEL2:

```
A>dir \level2
```

The screen will look like this:

```
Volume in drive A is MYDISK
Directory of  A:\LEVEL2

    .           <DIR>     9-09-84    1:30p
    ..          <DIR>     9-09-84    2:45p
MYPROG  COM     2463      7-30-84    8:55a
     3 File(s)    141312 bytes free
```

Note that all files in directory LEVEL2 have been listed, including the two special entries found in all subdirectories. The entry marked with a single period denotes the directory being listed (LEVEL2), and the double period denotes this directory's parent directory (in this case, the root directory). Thus, if your *current* directory is LEVEL2 and you wish to see the files in its parent directory, you can enter:

```
dir ..
```

Option 2 - List Selected Files

The following example lists the directory entry of the file named FILE3.A in the current directory of the default drive.

```
dir file3.a
```

the screen may look like this:

```
 Volume in drive A is MYDISK
 Directory of  A:\

FILE3    A      1613      5-27-84  12:14p
      1 File(s) 141312 bytes free
```

DIR (Directory) Command

If you type:

```
dir *.a
```

the screen may look like this:

```
 Volume in drive A is MYDISK
 Directory of  A:\

FILE1     A    10368       7-20-84  12:13p
FILE3     A     1613       5-27-84  12:14p
          2 File(s) 141312 bytes free
```

If you type:

```
dir file1
```

the screen may look like this.

```
 Volume in drive A is MYDISK
 Directory of  A:\

FILE1     A    10368       7-20-84  12:13p
FILE1           2288       9-02-84  12:25p
          2 File(s)  141312 bytes free
```

To display only the entry for a file that has no extension, enter the file name followed by a period. In this case, the *.ext* does *not* default to *. For example,

```
dir file1.
```

DISKCOMP (Compare Diskettes Only) Command

Purpose:

Compares the contents of the diskette in the first specified drive to the contents of the diskette in the second specified drive.

Notes:

1. This command is used only for comparing diskettes. If a fixed disk drive letter is specified, an error message is displayed.

2. This command compares two *entire diskettes*; the COMP command compares two *files*.

Format:

[*d:*][*path*]DISKCOMP [*d:* [*d:*]] [/1] [/8]

Type:

Internal External

***

Remark:

Specify the parameters:

[*d:*][*path*] before DISKCOMP to specify the drive and path that contains the DISKCOMP command file.

[*d:*] to specify the source drive.

[*d:*] to specify the target drive.

/1 to compare only the first side of the diskettes, even if the diskettes and drives are double-sided.

DISKCOMP (Compare Diskettes Only) Command

/8 to compare only 8 sectors per track, even if the first diskette contains 9/15 sectors per track.

You can specify the same drive or different drives in this command. If you specify the same drive, a one – drive comparison is performed. You are prompted to insert the diskettes at the appropriate time. DISKCOMP waits for you to press any key before it continues.

DISKCOMP compares all tracks on a track – for – track basis and issues a message if the tracks are not equal. The message indicates the track number and the side (0 or 1) where the mismatch was found.

After completing the comparison, DISKCOMP prompts:

```
Compare more diskettes (Y/N)?_
```

If you type **y**, the next comparison is done on the same drives that you originally specified after you receive prompts to insert the proper diskettes.

To end the command, type **n**. If the following message is displayed, insert the DOS diskette in drive *x* and press any key when ready.

```
Insert disk with \COMMAND.COM in drive A
and strike any key when ready
```

Notes:

1. If you omit both parameters, a one – drive comparison is performed on the default drive.

2. If you omit the second parameter, the default drive is used as the secondary drive.

7-100

DISKCOMP (Compare Diskettes Only) Command

3. On one physical drive compare (the source drive and the target drive are the same physical drive) all prompts are for the source drive letter.

4. DISKCOMP usually does not issue a **Diskettes compare OK** message if you try to compare a backup diskette created by the COPY command with the diskette you copied from. The COPY operation produces a copy that contains the same information, but may place the information at different locations on the target diskette from those locations used on the source diskette. In this case, you should use the COMP command to compare individual files on the diskettes.

5. If a diskette error occurs while DISKCOMP is reading the diskette, a message is produced that indicates where (track and side) the error occurred. Then DISKCOMP continues to compare the rest of the diskette. Because the remainder of the data to be compared cannot be read correctly from the indicated track and side, you can expect to receive a **Compare error** message.

6. DISKCOMP automatically determines the number of sides and sectors per track to be compared, based on the diskette that is to be read first (the first drive parameter entered).

   If the first diskette is formatted as single-sided, or if the /1 parameter is used, only the first side is read from both diskettes. If the first diskette contains 9 sectors per track, then DISKCOMP will compare 9 sectors per track unless you used the /8 parameter. If the first diskette contains 15 sectors per track, then DISKCOMP will attempt to compare 15 sectors per track. If the first drive and diskette are double-sided, and /1 is not specified, a two – sided comparison is done. In

DISKCOMP (Compare Diskettes Only) Command

this case an error message is produced if either the second drive or the diskette is a single-sided diskette.

7. The source and target drives cannot be virtual drives, such as those created by the SUBST command.

8. DISKCOMP does not recognize assigned drives.

9. DISKCOMP should not be used while a JOIN is in effect.

10. DISKCOMP does not work on network drives.

DISKCOMP Compatibility

DISKCOMP can be used only with certain combinations of diskette drives and diskettes. Check the following information to find out which types of diskettes you can compare in your system.

5.25 Inch, Single-Sided, Diskette Drives 160KB/180KB

- Compare a 160KB/180KB, single-sided, double-density diskette with a 160KB/180KB, single-sided, double-density diskette

DISKCOMP (Compare Diskettes Only) Command

5.25 Inch, Double-Sided Diskette Drives 320KB/360KB

- Compare a 160KB/180KB, single-sided, double-density diskette with a 160KB/180KB, single-sided, double-density diskette

- Compare a 320KB/360KB, double-sided, double-density diskette with a 320KB/360KB, double-sided, double-density diskette

5.25 Inch, High-Capacity Diskette Drives 1.2MB

- Compare a 160KB/180KB, single-sided, double-density diskette with a 160KB/180KB, single-sided, double-density diskette

- Compare a 320KB/360KB, double-sided, double-density diskette with a 320KB/360KB, double-sided, double-density diskette

- Compare a 1.2MB high-capacity, double-density diskette with a 1.2MB, high-capacity, double-density diskette

3.5 Inch, Double-Sided Diskette Drives 720KB

- Compare a 720KB double-sided diskette with a 720KB double-sided diskette

DISKCOMP (Compare Diskettes Only) Command

3.5 Inch, Double-Sided Diskette Drives 1.44MB

- Compare a 720KB double-sided diskette with a 720KB double-sided diskette

- Compare a 1.44MB double-sided diskette with a 1.44MB double-sided diskette

No other combinations are allowed. If you specify an invalid combination, the following message is displayed:

```
Drive types or
diskette types not compatible
```

Examples:

The following example compares the diskette in drive A to the diskette in drive B.

```
diskcomp a: b:
```

The following example compares the first diskette in drive A to the second diskette in drive A. Notice that by not specifying the source and target drive, a one − drive comparison is performed. You have to switch diskettes as prompted.

```
A>diskcomp
```

The following example compares the first diskette in drive B to the second diskette in drive A.

```
A>diskcomp b:
```

Purpose:

Copies the contents of the diskette in the source drive to the diskette in the target drive. The target diskette is formatted if necessary, during the copy.

Notes:

1. This command is used only for copying diskettes. If a fixed disk drive letter is specified, an error message is displayed.

2. This command copies two *entire diskettes*; the COPY command copies two *files*.

Format:

[*d*:][*path*]DISKCOPY [*d*: [*d*:]][/1]

Type:

Internal External

***

Remark:

Specify the parameters:

[*d*:][*path*] before DISKCOPY to specify the drive and path that contains the DISKCOPY command file.

[*d*:] to specify the source drive.

[*d*:] to specify the target drive.

DISKCOPY (Copy Diskettes Only) Command

/1 to copy only the first side of the diskette, regardless of the diskette or drive type.

You can specify the same drives or different drives. If the drives are the same, a one-drive copy operation is performed. You are prompted to insert the diskettes at the appropriate times. DISKCOPY waits for you to press any key before continuing.

After copying, DISKCOPY prompts:

```
Copy another (Y/N)?_
```

If you type **y**, the next copy is done on the same drives that you originally specified, after you are prompted to insert the proper diskettes.

To end the command, type **n**. If the following message is displayed, insert the DOS Start-Up Diskette or DOS Start-Up/Operating Diskette in drive *x* and press any key when ready.

```
Insert diskette with \COMMAND.COM in drive A
and strike any key when ready
```

Notes:

1. If the target diskette has not been formatted with the same number of sides and sectors per track as the source diskette, DISKCOPY will format the target diskette during the copy operation.

2. If you omit both drive parameters, a one-drive copy operation is performed on the default drive.

3. If you omit the second parameter, the default drive is used as the target drive.

4. If you omit the second parameter and you specify the default drive as the source drive, a one – drive copy operation is performed.

5. On a one physical drive copy (the source drive and the target drive are the same physical drive), all prompts refer to the source drive letter.

6. Diskettes that have had a lot of file creation and deletion activity become *fragmented*, because diskette space is not allocated sequentially. The first free sector found is the next sector allocated, regardless of its location on the diskette.

    A fragmented diskette can cause degraded performance due to excessive head movement and rotational delays involved in finding, reading, or writing a file.

    If this is the case, it is recommended that you use the COPY or XCOPY command, instead of DISKCOPY, to eliminate the fragmentation.

    For example, place a freshly formatted diskette in drive B, and the diskette you wish to copy in drive A. The command:

    ```
    copy a:*.* b:
    ```

    or

    ```
    XCOPY a:*.* b: /s
    ```

    copies all the files from the diskette in drive A to the diskette in drive B. The resultant files (in drive B) are now copied sequentially. You should get better performance when you use these files from now on.

7. You can run DISKCOMP after a successful DISKCOPY to verify that the diskettes are identical.

8. If disk errors are encountered on either diskette, DISKCOPY indicates the drive, track, and side

DISKCOPY (Copy Diskettes Only) Command

in error and proceeds with the copy. In this case, the target diskette (copy) may or may not be usable, depending on whether the affected diskette location was to contain valid data.

9. DISKCOPY automatically determines the number of sides and sectors per track to copy, based on the source diskette. If the source diskette is formatted as a single-sided diskette, DISKCOPY copies only the first side. If the source drive and diskette are double-sided, both sides can be copied (unless you override it with the /1 parameter). In this case, if the target drive is single-sided, an error message will indicate that the drives are incompatible.

10. The source and target drive cannot be a virtual drive, such as those created by the SUBST command.

11. DISKCOPY does not recognize an assigned drive.

12. Double-sided diskettes written on in a high-capacity diskette drive may not be reliably read in a single-sided or double-sided diskette drive.

13. DISKCOPY should not be used while a JOIN is in effect.

14. DISKCOPY does not work with network drives.

DISKCOPY (Copy Diskettes Only) Command

DISKCOPY Compatibility

DISKCOPY can be used only with certain combinations of diskette drives and diskettes. If an invalid combination is specified, information on the target diskette may be lost and the following message is displayed:

```
Drive types or
diskette types not compatible
```

If you want to copy the contents of a double-sided diskette to a high-capacity diskette, use the COPY *.* or XCOPY command. Refer to the COPY or XCOPY command in this chapter for more information.

Check the following information to find out which types of diskettes are compatible with your system.

5.25 Inch, Single-Sided Diskette Drives 160KB/180KB

- From one 160KB/180KB, single-sided, double-density diskette to another 160KB/180KB, single-sided, double-density diskette

5.25 Inch, Double-Sided Diskette Drives 320KB/360KB

- From a 160KB/180KB, single-sided, double-density diskette to a 160KB/180KB, single-sided, double-density diskette
- From a 320KB/360KB, double-sided, double-density diskette to a 320KB/360KB, double-sided, double-density diskette

DISKCOPY (Copy Diskettes Only) Command

5.25 Inch, High-Capacity Diskette Drives 1.2MB

- From a 160KB/180KB, single-sided, double-density diskette to a 160KB/180KB, single-sided, double-density diskette *
- From a 320KB/360KB, double-sided, double-density diskette to a 320KB/360KB, double-sided, double-density diskette *
- From a 1.2MB, high-capacity, double-density diskette to a 1.2MB, high-capacity, double-density diskette.

*Caution: You may not be able to reliably read these diskette types in a single-sided or double-sided diskette drive.

3.5 Inch, Double-Sided Diskette Drives 720KB

- From a 720KB double-sided diskette to a 720KB double-sided diskette

3.5 Inch, Double-Sided Diskette Drives 1.44MB

- From a 720KB double-sided diskette to a 720KB double-sided diskette
- From a 1.44MB double-sided diskette to a 1.44MB double-sided diskette

DISKCOPY (Copy Diskettes Only) Command

Examples:

The following example copies the diskette in drive A to the diskette in drive B.

```
diskcopy a: b:
```

The following example copies the source diskette in drive A to the target diskette in drive A. Notice that by not specifying the source and target drive, a one-drive copy is performed. You must switch diskettes as prompted.

```
A>diskcopy
```

The following example copies the source diskette in drive B to the target diskette in drive B. Notice that by not specifying the source and target drive, a one-drive copy is performed. You must switch diskettes as prompted.

```
B>diskcopy
```

ERASE
Command

Purpose:

Erases the specified file.

Format:

ERASE [*d:*][*path*]*filename*[*.ext*]

Type:

Internal External

   ***

Remark:

Specify the parameters:

[*d:*] to specify the drive that contains the file you want to erase.

[*path*] to specify the directory path that contains the file you want to erase.

filename[*.ext*] to specify the name of the file you want to erase.

Notes:

1. If the drive specifier is not specified, the default drive is assumed.

2. If the path is not specified, the current directory is assumed.

3. If you specify only the drive and path and omit the file name, all files in the specified directory will be erased.

4. You can use the global file name characters ? and * in the file name and extension. However, use global file name characters with caution because multiple files can be erased with a single command.

   Note: Before using the ERASE command with the global file name characters in place of the file name or extension, obtain a list of the files to be deleted using the DIR command.

5. The operating system files IBMBIO.COM and IBMDOS.COM cannot be erased.

6. If you use the filespec *.* to erase all of the files on a disk, the following message is displayed to verify that you actually want to erase all files:

   Are you sure (Y/N)?

   Type **y** (yes) and press Enter if you *do* want to erase all the files on the disk.

   Type **n** (no) and press Enter if you do not want to erase all files on the disk.

7. You cannot erase files that are marked as read − only.

8. You cannot use ERASE to erase a subdirectory. To delete a subdirectory you need to use the RMDIR (remove directory) command.

9. Extra care should be exercised when using ERASE after using ASSIGN, JOIN, or SUBST.

ERASE
Command

Examples:

The following example erases the file name
FILE.BAT from the diskette in drive A.

```
A>erase a:file.bat
```

The following example erases all files from the
directory \LEVEL1 on drive C.

```
A>erase c:\level1
```

Purpose:

DOS locates files by searching each directory in the path to the file each time the file is accessed. On fixed disks with complex directory structures, this can take a large amount of time. FASTOPEN stores in memory the location of directories and recently opened files. When accessing a file, FASTOPEN searches the memory list first; if the file is in the list, it is found very quickly.

Format:

[*d:*][*path*]FASTOPEN d:[= *nnn*] . . .

Type:

Internal External

***

Remark:

Specify the parameters:

[*d:*][*path*] before FASTOPEN to specify the drive and the path that contain the FASTOPEN command file.

d: to specify the drive to process. Any fixed disk drives may be used. Drives defined by JOIN, SUBST, or ASSIGN may not be used. Network drives may not be used.

nnn to specify the number of directories or file entries to remember for the drive specified as *d*. If the value is not provided, the default is 34. (The minimum is 10 and the maximum is 999.) The sum of all *nnn* cannot be greater than 999. If *nnn* files are

accessed on a drive. The least recently accessed file is removed from the list and replaced by the most recently accessed file. The value *nnn* should be bigger than the system's deepest level of subdirectory. For example:

```
c:\dir1\dir2\dir3...\dir10
```

shows that DIR10 is the deepest level subdirectory and the value for *nnn* should be greater than 10.

The *d:*[= *nnn*] parameter may be repeated for each disk on your computer.

FASTOPEN can be used only once. All drives must be defined the first time FASTOPEN is used. Normally FASTOPEN is placed in the AUTOEXEC.BAT file.

```
AUTOEXEC.BAT
fastopen c:=100
  .
  .
  .
copy c:\dir1\dir2\dir3\myfile1
copy c:\dir1\dir2\dir3\myfile2
```

On the first copy, the directories DIR1, DIR2, and DIR3 are located and remembered; MYFILE1 is also remembered. On the second copy, directories DIR1, DIR2, and DIR3 are found in the FASTOPEN list and do not need to be found on the disk; MYFILE2 is now remembered.

Note: The number *nnn* is not related to the number of files specified in "FILES = " command.

The optimal number of files specified for FASTOPEN varies depending on your usual operations. If you specify the minimum number of 10, you may not fully and efficiently utilize the FASTOPEN command. If you specify the maximum value of 999, you may have overhead to search through the information stored in memory to find the desired file. To store information on each of the *nnn* directories or files, 35 bytes of system memory are required

FDISK
Command

Purpose:

Allows you to create, set up, display, and delete the DOS partitions on a fixed disk.

Format:

[*d:*][*path*]FDISK

Remark:

Specify the parameters:

[*d:*][*path*] before FDISK to specify the drive and the path that contain the FDISK command file.

- Typing FDISK displays the FDISK main menu screen, and a prompt for the required information is displayed.

- The input selection contains numerical data or a Y/N prompt. A default value is provided with each input, and a status message is displayed after each action is performed to confirm that the action was successful. If an action is invalid or not applicable, then a status message is also displayed.

- The ESC key is used to return to previous screens.

- If any of the partition information is changed within the DOS partition, DOS restarts the system when you exit FDISK.

  Note: If no changes have been made to the extended DOS partition or any of its disk volumes, DOS will not restart, unless a volume is deleted.

See Chapter 3, "Dividing Your Fixed Disk," in this book for more information.

Extended DOS Partitions

FDISK allows you to create an extended DOS partition and then manage the creation and deletion of logical drives within this partition. FDISK allows you to select the size of logical drives in cylinder size units. The maximum default size of a logical drive is 32MB. The additional created partitions act as logical multiple drives within a one fixed drive system.

> **Note:** FDISK cannot be run when any other multi − tasking system is in operation attempting to access a disk (such as PC Network).

FIND Filter
Command

Purpose:

Sends all lines from the specified file names that contain the specified string to the standard output device.

Format:

[*d:*][*path*]FIND [/V][/C][/N]"*string*"
[[*d:*][*path*]*filename*[*.ext*]...]

Type:

Internal External

***

Remark:

Specify the parameters:

[*d:*][*path*] before FIND to specify the drive specifier and path that contain the FIND command file.

/V to display all lines *not* containing the *string*.

/C to display a count of the number of lines containing *string*. If /C is specified with /N, then FIND ignores /N.

/N to display the relative line number of each matching line ahead of the line from the file.

Enclose the string in double quotes ("). Two quotes in succession are taken as a single quote. An uppercase string does not match a lowercase string.

Global file name characters are not allowed in the file names or extensions.

The file is searched up to the first end-of-file character (Ctrl-Z).

Examples:

The following example displays all lines from BOOK1.TXT, BOOK2.TXT, and BOOK3 (in that order) that contain the string "Fool's Paradise."

```
A>find "Fool's Paradise" book1.txt book2.txt
book3
```

The following example displays the names of all files in the current directory of drive **B** that *do not* contain the string "DAT."

```
A>dir b: | find /v "DAT"
```

The following example displays all the subdirectory entries in the current directory, redirecting the output of the DIR command to the FIND filter, and then displaying the directory entries that contain DIR.

```
A>dir | find "<DIR>"
```

For the following examples, assume the file PROG contains the following lines:

```
This is a
beautiful
day for a picnic.
```

FIND Filter
Command

The following example displays the lines in the file
PROG that do not contain the string "f".

```
A>find /v"f"prog
```

The result is:

```
----------a:prog
This is a
```

The following example displays the relative line
number of the lines that contain the string "f".

```
find /n"f"prog
```

The result is:

```
----------a:prog
[2]beautiful
[3]day for a picnic.
```

The following example displays a count of the
number of lines in the file PROG that contain the
string " a ".

```
A>find /c" a "a:prog
```

The result is:

```
----------a:prog:1
```

Purpose:

Initializes the disk in the designated drive to a recording format acceptable to DOS; analyzes the entire disk for any defective tracks; and prepares the disk to accept DOS files by initializing the directory, File Allocation Table, and system loader.

CAUTION

Please note that formatting destroys all data on the disk. Because of this, you should be very careful before you decide to format any disk, particularly a fixed disk. If you attempt to format your fixed disk, be aware that the entire contents of any previously created DOS partition, including all subdirectories and their contents, are destroyed. Be sure to set up a DOS partition on all fixed disks before formatting a fixed disk. FORMAT does not recognize a fixed disk as being a DOS disk if a DOS partition does not exist on the disk, it moves to the next fixed disk and begins formatting it. If you do not specify a drive letter, the following message is displayed:

```
Drive letter must be specified
```

Format:

[*d*:][*path*]FORMAT *d*:[/S][/1][/8][/V][/B][/4] [/N:*xx*][/T:*yy*]

Type:

Internal External

***

FORMAT
Command

Remark:

Specify the parameters:

[*d*:][*path*] before FORMAT to specify the drive specifier and path that contain the FORMAT command file.

d: to specify the drive that contains the disk you want to format.

/S to copy the operating system files from the DOS diskette in the default drive to the new disk in the following order:

```
IBMBIO.COM
IBMDOS.COM
COMMAND.COM
```

If the system does not reside on the default drive, and the default drive is non − removable, FORMAT prompts you to put a system diskette in diskette drive A. If the system is not on the default drive and the default drive is removable, FORMAT prompts you to insert a system diskette in the default drive.

/1 to format a diskette for single-sided use (5.25 inch drives only).

/8 to format a diskette for 8 sectors per track. FORMAT defaults to 9 or 15 sectors per track if you do not specify **/8**. Note that FORMAT always creates 9 or 15 physical sectors on each diskette track, but it instructs DOS to use only 8 sectors per track if you use the **/8** parameter (5.25 inch drives only).

/V to give the disk a volume label. We strongly recommend that you use the **/V** parameter. This uniquely identifies each disk.

The volume label cannot be used in place of file names as input to any of the DOS commands. The volume label is for your use in keeping track of your disks.

/B to format a diskette for 8 sectors per track diskette with space allocated for the IBMBIO.COM and IBMDOS.COM system modules. It does not place the system modules or the command processor on the diskette. This parameter is used to create a diskette on which any version of DOS can be placed through that version's SYS command. If the **/B** parameter is not used, only DOS Version 3.30 can be placed on the diskette through the SYS command.

/4 to format a single-sided or double-sided diskette in a 1.2MB high-capacity drive. This parameter is intended to allow use of single-sided and double-sided diskettes in the high-capacity drives. However, the diskettes formatted with the /4 parameter specified may not be read reliably or written in a single- or double-sided drive (5.25 inch drives only).

/N:*xx* to specify the number of sectors per track to format.

/T:*yy* to specify the number of tracks to format.

/N:*xx* and /T:*yy* are used when you want to format a diskette to less than the maximum supported capacity of the diskette drive. See "FORMAT Compatibility" in this section for the supported media types.

FORMAT
Command

The following table shows which parameters are valid for certain diskette types:

Disk Type	Parameters Allowed
160KB/180KB	/S, /V, /1, /8, /B, /4
320KB/360KB	/S, /V, /1, /8, /B, /4
720KB/1.44MB	/S, /V, /N, /T
1.2MB	/S, /V, /N, /T
fixed disk	/S, /V

Notes:

1. All new diskettes and fixed disks must be formatted before they can be used by DOS. Refer to Chapter 3 for more information before formatting your fixed disk.

2. A fixed disk must also be formatted again if you change the size of its DOS partition with the FDISK command.

3. Formatting destroys any previously existing data on the disk.

4. During the formatting process, any defective tracks are marked as *reserved* to prevent the tracks from being allocated to a data file.

5. Directory entries for IBMBIO.COM and IBMDOS.COM are marked as *hidden files*, and therefore, they do not appear in any directory searches—including the DIR command.

6. FORMAT prompts you to enter a volume label (volume identification) if you have used the /V

parameter. The label can consist of from 1 to 11 characters. All characters acceptable in file names are acceptable in the volume label. Unlike file names, however, the volume label does not contain a period between the eighth and ninth characters.

You can add or change a volume label using the LABEL command. For more information refer to the LABEL command in this chapter.

7. FORMAT produces a status report, that indicates:

   • Total disk space

   • Space marked as defective

   • Space currently allocated to the DOS system files (when /S is used)

   • Amount of space available for your files

8. FORMAT determines the target drive type and formats the disk or diskette accordingly. For diskettes, if the diskette can be successfully read and written on only one side, the diskette is formatted for single-sided use, 8 sectors per track; it can be used in either type of drive. If the target drive is double-sided and you do not use the /1 parameter, the diskette is formatted for double-sided use; it will not be usable in a single-sided drive.

9. Fixed disks are already physically formatted (proper recording format) when shipped by IBM. When formatting a fixed disk, FORMAT checks all locations within the DOS partition, but does not physically format them again.

10. If the /S parameter is used and the system has insufficient available memory for FORMAT to load all three system modules, it will load as many modules as it can, format the target disk, and write the modules that are in memory. It must then read the remaining modules from the source disk so they can be placed on the target disk. If the source diskette has been removed from the drive, an appropriate message will prompt you to reinsert it before FORMAT can continue.

11. The parameters /S and /V cannot be specified with the /B parameter.

12. If you specify the /S parameter, the system files are copied from the default drive. If the default drive is a fixed disk drive that does not contain the system files, then you are prompted to insert the DOS diskette in drive A.

13. If you specify the /N or /T, then both parameters must be entered, or FORMAT returns the following message **Invalid parameter** .

14. The parameters /N and /T should not be used on a fixed disk. The message **Parameters not compatible with fixed disk** will be returned.

15. FORMAT allows you to specify /V or /S with the /N and /T parameters.

16. To create a single – sided diskette, you can use the /T /N on machines that support this function or on machines that do not. An **Invalid parameter** is returned. The /1 can be used with /T /N if the target drive is a high capacity drive, and /T /N specifies a 320KB/360KB diskette. For example, (/T:40 /N:9 or /T:40 /N:8). To

format a 720KB diskette in a 1.44MB drive, use /N:9 /T:80.

17. FORMAT ignores any drive reassignments (see the ASSIGN command in this chapter.)

18. The FORMAT command sets the exit code as follows:

0   Successful completion of most recent format

1   Not defined

2   Not defined

3   Terminated by user (Ctrl-Break)

4   Terminated due to error

5   Terminated due to "N" response on a fixed disk.

These codes can be used with the batch processing IF ERRORLEVEL subcommand.

19. FORMAT should not be used with drives involved in a JOIN or substitution (SUBST).

20. FORMAT does not work on network drives.

FORMAT
Command
FORMAT Compatibility

The following table shows the possible diskette combinations that may be used with FORMAT:

Drive Type	Diskette Type
160KB/180KB	160KB/180KB single-sided diskettes
320KB/360KB	320KB/360KB single-sided or double-sided diskettes
720KB	720KB double-sided diskettes*
1.2MB	160KB/180KB single-sided**, 320KB/360KB double-sided** or high-capacity diskettes
1.44MB	720KB double-sided diskettes *** 1.44MB double-sided diskettes****

* Do not format 2.0MB capacity or HD diskettes in a 720KB drive. ** To format a single-sided or double-sided diskette in a high-capacity drive, use the /4 parameter referred to in this chapter.
*** To format a diskette labeled 1.0MB capacity, 2HC or with no label, in a 1.44MB drive, use the FORMAT command with these parameters: **/N:9 /T:80**.
**** To format a diskette labeled 2.0MB capacity or HD, in a 1.44MB drive, use the FORMAT command without the /N and /T parameters.
No other combinations are allowed.

Parameter Compatibility

FORMAT supports setting up diskettes for previous versions of DOS. To avoid situations where the diskette may be incompatible with version 1.10 some parameters are incompatible. Because /B and /8 produce 8 sector diskettes (presumably to run on DOS 1.10) /V cannot be specified because DOS 1.10

does not support volume labels. If the /S option also is specified, FORMAT assumes that only the current version of DOS will be used, so /8 is allowed. Because /B leaves room for system files but does not copy them /S is contradictory when used with /B. /B /V /8, is not allowed, /8 /V /S is allowed.

Examples:

By issuing the following command, the diskette in drive B is formatted and the operating system files are also copied:

```
A>format b:/s/v
```

The system displays the following message:

```
Insert new diskette for drive B:
and strike ENTER when ready
```

After you insert the appropriate diskette and press ENTER, the system displays this message:

```
Head   h   Cylinder   c
```

while the diskette formatting is taking place.

Once the formatting is complete, the system displays this message:

```
Format complete
System transferred

Volume label (11 characters, ENTER for none)? mydisk

xxxxxx bytes total disk space
 xxxxx bytes used by system
xxxxxx bytes available on disk

Format another (Y/N)?n
```

In the above example, note that MYDISK was typed as the volume label.

FORMAT
Command

Type **y** and press Enter to format another diskette.

Type **n** and press Enter to end the FORMAT program.

When you format a fixed disk, that has previously been formatted using FORMAT you see the following message instead of the prompt to insert a diskette:

```
Enter current Volume Label for Drive
   (Press enter for none):
WARNING, ALL DATA ON NON-REMOVABLE DISK
DRIVE x: WILL BE LOST!
Proceed with Format (Y/N)?
```

The *x* is replaced by the drive letter you typed. If you want to format your fixed disk, type **y** and press Enter. If you do not want to format your fixed disk, type **n** and press Enter.

If the Volume label you specified does not match the volume label on the disk, the following message is displayed:

```
Invalid Volume label
```

Fixed disk formatting can take several minutes because of the large size that can be allocated to DOS, so don't be alarmed if it takes some time before you are prompted for the volume label. You can tell that FORMAT is working by noting that your fixed disk drive light is on.

GRAFTABL (Load Graphics Table) Command

Purpose:

Loads a table of additional character data into memory for the color/graphics mode.

Format:

[*d:*][*path*]GRAFTABL [437|860|863|865|/*STATUS*]

Type:

Internal External

***

Remark:

Specify the parameters:

[*d:*][*path*] before GRAFTABL to specify the drive and path that contain the GRAFTABL command file.

437	United States (default value)
860	Portugal
863	Canada (Fr.)
865	Norway and Denmark

/*STATUS* displays the number of the selected country code page.

Use GRAFTABL to display national language characters when in graphics mode on the color/graphics adapter. GRAFTABL loads a table of data in memory which defines these additional characters for the color/graphics adapter to use. This allows the ASCII characters 128 thru 255 to be displayed when using the color/graphics adapter in graphics mode. This command increases the resident size of DOS in memory.

GRAFTABL (Load Graphics Table) Command

- GRAFTABL may be used multiple times to change the loaded characters.

Examples:

The following example loads the table of graphics characters for the Portuguese code page:

```
graftabl 860
```

The system now supports display of ASCII characters 128 through 255 in the graphics mode on the color/graphics adapter.

The GRAFTABL command sets the following ERRORLEVEL (normal) code:

0 There is no previously defined character table and specifies a code page now resident. The RAM size is reduced by 1360 bytes.

1 A previously loaded character table exists. If a new table was requested, it has replaced the previous table at its original location.

2 No previously loaded character table exists, and no new table is loaded.

The GRAFTABL command sets the following ERRORLEVEL (error) code:

3 Incorrect parameter; no action taken.

4 Incorrect version of DOS; DOS 3.30 required.

Purpose:

Allows the contents of a graphics display to be printed on an IBM Personal Computer printer when using a color/graphics monitor adapter and screen.

Format:

[*d*:][*path*]GRAPHICS [*printer type*][/R][/B][/LCD]

Type:

Internal External

***

Remark:

Specify the parameters:

[*d*:][*path*] before GRAPHICS to specify the drive and path that contains the GRAPHICS command file.

[*printer type*] to specify the type of printer you are using. You can choose from the following types:

COLOR1 - IBM Personal Computer Color Printer with black ribbon (prints up to 4 shades of grey)

COLOR4 - IBM Personal Computer Color Printer with RGB (red, green, blue, black) ribbon

COLOR8 - IBM Personal Computer Color Printer with CMY (black, cyan, magenta, yellow) ribbon

GRAPHICS (Screen Print) Command

COMPACT - IBM Personal Computer Compact Printer

GRAPHICS - IBM Personal Graphics Printer

GRAPHICS - IBM Proprinter

THERMAL - IBM PC Convertible Printer

If you do not specify a printer type, the default is the GRAPHICS printer.

/R to print black (as seen on the monitor) and white (as seen on the monitor) on the printer. If you do not specify /R, the default is to print black as white and white as black.

/B to print the background color. This parameter is only for printer types COLOR4 and COLOR8. If you do not specify /B, the default is not to print the background color.

[/LCD] to print the image exactly as it appears on the IBM PC Convertible Liquid Crystal Display.

This command increases the resident size of DOS in memory.

Press the Shift – PrtSc keys to print the screen contents on the printer. If the screen is in text mode, the text is printed in less than 30 seconds. If the screen is in the graphics mode, modes 4, 5, 6 only (see Hardware Technical Reference for more information) each time the PrtSc key is pressed, the following happens:

- In the 320x200 color graphics mode with printer types GRAPHICS and COLOR1, the screen contents are printed in up to four shades of gray.

GRAPHICS (Screen Print) Command

- In the 640x200 color graphics mode, the screen is printed sideways on the paper. The upper right corner of the screen is printed on the upper left corner of the paper.

- Printing may take as long as 3 minutes.

- To invoke the screen print from an assembly language program, use the following coding example:

```
PUSH BP
INT  5
POP  BP
```

Examples:

The following example loads graphics support needed to print the screen contents on a COLOR8 printer. The background colors are printed and black prints as black and white as white.

```
A>graphics color8 /b /r
```

JOIN
Command

Purpose:

Logically connects a drive to a directory on another drive to produce a single directory structure from two separate directories.

Format:

[*d:*][*path*]JOIN

or

[*d:*][*path*]JOIN *d: d: \directory*

or

[*d:*][*path*]JOIN *d: /D*

Type:

Internal External

***

Remark:

Specify the parameters:

[*d:*][*path*] to specify the drive and path that contains the JOIN command file, if it is not in the current directory of the default drive.

d: to specify the drive to be connected to a directory on another drive.

d:\directory to specify the directory that you will join a drive under. The directory must be at the root and only one level deep.

If the directory you specify in the path does not exist, it is created on the drive you specify. If the directory does exist, it must be empty. An empty directory only contains the entries (.) and (..). For example, if the directory of C:\LEVEL1 is empty, the following is displayed if you type **dir c:\level1**

```
Volume in drive C is EMPTY
Directory for C:\LEVEL1

.          <DIR>                1-01-85      12:03a
..         <DIR>                1-01-85      12:03a
   2 File(s)    1048956 bytes free
```

/D to disconnect a join. You must specify the drive letter of the drive whose join you want to delete. For example, if you joined drive B to the directory on drive C:\JOINB, to disconnect the directories, type:

```
join b: /d
```

Notes:

1. The message **Directory not Empty** is displayed if the directory you try to JOIN is not empty.

2. The path you specify cannot be the current directory. If you try to JOIN to the current directory, the message **Invalid parameter** appears.

3. The message **Invalid drive specification** is displayed if you refer to a joined drive. For example, if you join drive A, you cannot refer to the drive letter A until you remove the JOIN (/D parameter). This means you cannot JOIN the default drive because you will then be on an invalid drive.

4. The directory path you specify cannot be the root directory (\).

JOIN
Command

5. Type JOIN with no parameters specified to display the drives and directories that are currently joined. The information displayed indicates the drive that is joined and the path the drive is joined to. For example, the following message indicates that drive **A** is joined to the directory path **C:\LEVEL1**.

    ```
    A: => C:\LEVEL1
    ```

6. The entire tree (starting from the root) of the specified drive is joined, regardless of the current directory of that drive.

7. JOIN does not allow network drives for either parameter. The message **Cannot JOIN a network drive** appears if you attempt to do so.

8. Unpredictable results occur if the drive being JOINed is part of a substitution (SUBST) or reassignment (ASSIGN).

9. BACKUP, RESTORE, FORMAT, DISKCOPY, and DISKCOMP should *not* be used while a JOIN is in effect.

Examples:

For the following examples, assume:

•   The default drive is drive B

•   The current directory of drive C is C:\

Joining a Drive to a Directory Path

Assume the directory structure of drive C looks like this:

```
            ┌──────────┐
            │   C:\    │
            └──────────┘
      ┌───────────┴────────────┐
┌──────────┐              ┌──────────┐
│  FILES   │              │ REPORTS  │
└──────────┘              └──────────┘
```
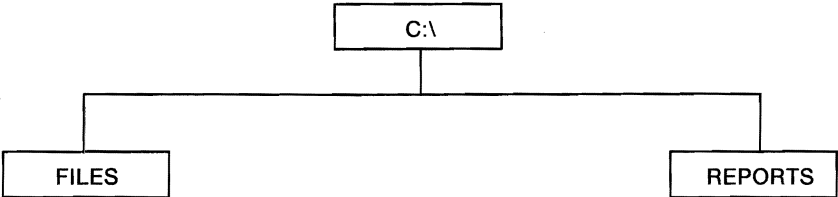
You can join drive A to the path C:\DRIVEA by typing:

```
join a: c:\drivea
```

The directory structure of drive C now looks like this:

```
              ┌──────────┐
              │   C:\    │
              └──────────┘
     ┌─────────────┼──────────────┐
┌──────────┐  ┌──────────┐  ┌──────────┐
│  FILES   │  │ REPORTS  │  │  DRIVEA  │
└──────────┘  └──────────┘  └──────────┘
```
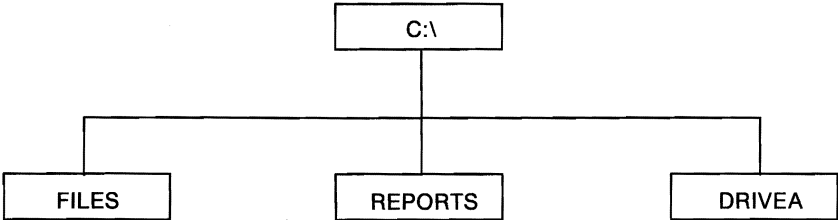
Note: Notice that the directory DRIVEA was created on drive C by the JOIN command.

If you type **dir c:**, the following is displayed:

```
Volume in drive C is FIXEDC
Directory for C:\

FILES      <DIR>          8-21-85    2:10p
REPORTS    <DIR>          9-23-85    5:55p
DRIVEA     <DIR>          9-30-85   12:03a
   3 File(s)  1048956 bytes free
```

JOIN
Command

If you type **dir a:**, the message **Invalid drive specification** is displayed because you cannot refer to a joined drive. If you enter **dir c:\drivea**, the directory of the disk in drive A is displayed. The **"bytes free"** displayed are those of C.

Displaying the Current Joins

The following example displays the current joins from the previous example.

```
B>join
```

The following is displayed:

```
A: => C:\DRIVEA
```

Deleting a Join

The following example deletes the join from the previous example.

```
B>join a: /d
```

Now you can refer to drive A because the join is removed.

Why Use JOIN?

JOIN can be used to help applications take advantage of fixed and virtual disks. The following example shows a way that files on A can be accessed through C.

```
D>join a: c:\datafils.dir
D>cd c:\datafils.dir
D>path=c:\
D>dataprog c:
```

Purpose:

Loads a keyboard program that replaces the keyboard program resident in ROM BIOS to support non-U.S. English keyboards.

Note: The keyboard programs provided on previous versions of DOS are not compatible with DOS 3.30 and should not be executed when running under DOS 3.30.

Format:

[*d:*][*path*]KEYB
[*xx*[,[*yyy*],[[*d:*][*path*]*filename*[.*ext*]]]]

Type:

Internal External

***

Remark:

Specify the parameters:

[*d:*][*path*] before KEYB to specify the drive and path that contain the KEYB command file. If no other parameters are specified, KEYB will return the current status of the keyboard and display.

xx to specify the keyboard code (see Appendix B, Country and Keyboard Codes).

yyy to specify the numeric code page defining the character set (see Appendix B, Country and Keyboard Codes). If the *yyy* parameter is omitted, KEYB will use the country default code page.

KEYB (Load Keyboard) Command

[[*d*:][*path*]*filename*] to specify the drive, path, and filename of the keyboard definition file (KEYBOARD.SYS) to support a country language. If this parameter is omitted, KEYB will look for the file KEYBOARD.SYS in the root directory of your current drive.

The first use of this command loads a program into memory that replaces the ROM BIOS keyboard program.

• You can change from the current keyboard to the US keyboard format and back again at any time by holding down the Ctrl and Alt keys and pressing F1. Press Ctrl − Alt − F2 to return to the specified country keyboard format contained in the memory resident keyboard program.

• You can change the country keyboard format without restarting the computer (the KEYB command can be used multiple times).

• The copy of the DOS Start-Up Diskette or DOS Start-Up/Operating Diskette you created with the SELECT command loads KEYB when you start DOS. Refer to Chapter 3 for information on the SELECT command.

• The Country and Keyboard Codes table in Appendix B contains keyboard codes to support a particular country keyboard. See Chapter 9 for the valid keyboard code page pairs.

Non-US keyboards have some keys with "front − face" characters. To use these characters, press and hold the Ctrl and Alt keys, and press the appropriate character key.

KEYB (Load Keyboard) Command

Note: For users that have the Canadian French keyboard, press and hold the Alt and shift keys, and press the appropriate key.

You can get accented characters with the use of "dead keys," that is, keys that do not produce characters unless they are used in combination with another key. To "build" an accented character, press and release the accent key and then press the appropriate letter key. To use the accent character by itself, press the accent key and then press the spacebar.

See "Allowable Dead Key Combinations," in Appendix D in this book.

KEYBOARD.SYS

The KEYBOARD.SYS file contains tables which direct the KEYB.COM command to convert scan codes to ASCII characters. To change a keyboard, the new keyboard must support at least one of the the currently prepared code pages for the CON device. You can change the keyboard without restarting the computer. (For example, the KEYB command can be used multiple times.)

The MODE command is used to prepare the new code pages required by the new keyboard layout; only certain keyboards or code page combinations are allowed. If a mismatch is created between keyboard and display, character keys may not be correctly translated into the correct code page, and incorrect characters may be displayed.

KEYB (Load Keyboard) Command

The following table shows the valid combinations of code pages and keyboards:

Code Page	Keyboard
437	US, UK, FR, GR, IT, SP, LA, SV, SU, NL
850	UK, FR, GR, IT, SP, DK, NL, SU, NO, PO, SV, SF, SG, CF, BE, LA, US
860	PO
863	CF
865	NO, DK

The KEYB command creates translation tables for each code page that has been prepared at the time KEYB is issued. It will activate the code page that has been requested. If a code page is desired that is not in that list of prepared code pages, it must be first prepared and then KEYB should be issued again. Refer to the MODE command in this chapter.

If a code page has been selected previous to the KEYB command, and no code page is specified in KEYB, it will attempt to activate the selected code page.

KEYB (Load Keyboard) Command

The KEYB command sets the following ERRORLEVEL code:

0 Successful execution and termination

1 Invalid language, code page, or syntax

2 Bad or missing keyboard definition file

3 KEYB could not create a keyboard table in resident memory

4 An error condition occurred when communicating with the CON device

5 Code page request has not been prepared

6 The translation table for the selected code page cannot be found in the resident keyboard table.

LABEL (Volume Label)
Command

Purpose:

Allows you to create, change or delete a volume label on a disk.

Format:

[*d:*][*path*]LABEL [*d:*][*volume label*]

Type:

Internal External

***

Remark:

Specify the parameters:

[*d:*][*path*] before LABEL to specify the drive and path that contains the LABEL command file.

[*d:*] to specify the drive letter of the disk you want to label. If you do not specify a drive letter, the default drive is assumed.

[*volume label*] to specify the volume label. Volume labels are used to identify a disk. They can be up to 11 characters and are in the same format as volume labels created by FORMAT/V. If you do not specify a volume label, you are prompted with the following messages:

```
Volume in drive X is xxxxxxxxxxx

Volume label (11 characters, ENTER for none)?
```

To give the disk a volume label, type the label you want and press Enter.

To change an existing volume label, type the new volume label and press Enter. The new label you typed replaces the existing volume label.

To delete a volume label, do not specify a volume label; just press Enter. Then you are prompted:

```
Delete current volume label (Y/N)?
```

Type **y** and press Enter. The volume label on the disk is deleted.

If you type more than 11 characters for the volume label, only the first 11 characters are used.

Examples:
Creating a Volume Label

The following example creates a volume label called ADDRESS on the diskette in drive A.

```
A>label a:address
```

The following example gives the fixed disk C the label FIXEDISKC.

```
A>label c:fixediskc
```

Changing a Disk's Volume Label

The following example changes the volume label of the diskette in drive A from ADDRESS to PROGRAMS.

```
A>label a:
```

Then you are prompted:

```
Volume in drive A is ADDRESS

Volume label (11 characters, ENTER for none)?
```

LABEL (Volume Label) Command

Type:

```
programs
```

Then press Enter.

Deleting a Volume Label

The following example deletes the volume label PROGRAMS from the diskette in drive A.

```
A>label a:
```

You are prompted:

```
Volume in drive A is PROGRAMS

Volume label (11 characters, ENTER for none)?
```

Press Enter. The following prompt is displayed:

```
Delete current volume label (Y/N)?
```

Type **y** and then press Enter. The volume label for drive A is deleted.

> **Note:** LABEL should not be used with
> SUBSTed drives. The *root* directory of the
> actual drive will be the target of LABEL.
> LABEL should not be used with ASSIGNed
> drives or to label network drives.

Purpose:

Creates a subdirectory on the specified disk.

Format:

MKDIR [*d:*]*path*

or

A > MD [*d:*]*path*

Type:

Internal External

***

Remark:

Specify the parameters:

[*d:*] to specify the drive letter of the disk you want to create the subdirectory on. If you do not specify a drive, the default drive is assumed.

path to specify the path of directory names. Subdirectory names are in the same format as file names. All characters that are valid for a file name are also valid for a directory name. For more information on paths, refer to Chapter 5, "Using Tree-Structured Directories."

> **Note:**   You can create as many subdirectories as you wish, limited only by available disk space. However, you should ensure that the maximum length of any single path from the root directory to the desired level is no more then 63 characters, including imbedded backslashes.

MKDIR (Make Directory) Command

Each directory can contain file and directory names that also appear in other directories. In other words, two or more files or directories can have the same name, as long as they are defined in separate directories.

Examples:

The following example creates the subdirectory called LEVEL1 under the root directory.

```
A>md \level1
```

The following example creates the subdirectory LEVEL2 under the subdirectory LEVEL1.

```
A>md \level1\level2
```

If the current directory is \LEVEL1, the following example creates the subdirectory LEVEL2 under the subdirectory LEVEL1.

```
A>md level2
```

The last example does the same thing as the second. Note that in the second example, the first \ tells DOS to begin its directory search with the *root* directory. The absence of a leading \ in the last example causes DOS to begin at the *current* directory.

> **Note:** Care should be taken when making directories while an ASSIGN, JOIN, or a SUBST is in effect.

Purpose:

Sets the way that a printer, a Color/Graphics monitor adapter, or an Asynchronous Communications Adapter operates; and it sets up and controls code page switching.

Format:

[*d:*][*path*]MODE LPT#[:][*n*][,[*m*][,P]]

or

[*d:*][*path*]MODE *n*

or

[*d:*][*path*]MODE [*n*],*m*[,T]

or

[*d:*][*path*]MODE COM#[:]*baud*[,[*parity*]][,[*databits*][,[*stopbits*][,P]]]]

or

[*d:*][*path*]MODE LPT#[:] = COM*n*

or

[*d:*][*path*]MODE *device* CODEPAGE PREPARE = ((*cp*) [*d:*][*path*]*filename*[*.ext*])

or

[*d:*][*path*]MODE *device* CODEPAGE PREPARE = ((*cplist*) [*d:*][*path*]*filename*[*.ext*])

MODE
Command

or

[*d*:][*path*]MODE *device* CODEPAGE SELECT = *cp*

or

[*d*:][*path*]MODE *device* CODEPAGE [/*STATUS*]

or

[*d*:][*path*]MODE *device* CODEPAGE REFRESH

Type:

Internal External

***

Remark:

Note:

- CODEPAGE can be shortened to CP

- PREPARE can be shortened to PREP

- SELECT can be shortened to SEL

- REFRESH can be shortened to REF

- STATUS can be shortened to STA

A missing or invalid *n* or *m* parameter means that the mode of operation for that parameter is not changed.

Technical Note:

Option	Parameters
1	P
2	R - L
3	P
4	

When using the following options and parameters listed in the table above, the MODE command causes printer and Asynchronous Communications Adapter intercept code and screen parameter table information to be resident in memory. This increases the resident size of DOS in memory. The resident portion is common for all four operations that cause it to be loaded. Once loaded, invoking another option causing residency does not cause any additional code to become resident.

Notes:

1. MODE LPT#[:][n][,m] disables the redirection for the printer designated by the #. Redirection causes a portion of MODE to remain resident.

2. Because LPT#[:] and COM[:] are DOS device names, you can specify them with or without the colon (:). For example, you can specify:

```
mode lpt1: 132,8
```

or

```
mode lpt1 132,8
```

or

MODE
Command

```
mode lpt1=com1
```

The MODE command has eight format options:

Option 1 (For the printer)

MODE LPT# [:][*n*][,[*m*] [,P]]

where:

\# is 1, 2, or 3 (the printer number)
n is 80 or 132 (characters per line)
m is 6 or 8 (lines per inch vertical spacing)
P specifies continuous retry on time-out errors

For example:

```
mode lpt1:132,8
```

sets the mode of operation of printer number 1 to
132 characters per line and 8 lines per inch vertical
spacing. The power-on default options for the
printer are 80 characters per line and 6 lines per inch.
If the printer is reset or initialized, the default values
are set (BASICA initializes the printer).

If you specify an invalid **n** or **m** value, the values are
ignored and the previous value is unchanged. The
retry loop can be stopped by pressing Ctrl-Break.
To stop time-out errors from being continuously
retried when you have entered **P**, you must use
MODE Option 1 without specifying **P**. You should
not request continuous retries for printers being
shared on the IBM PC Network.

**Option 2 (For switching Display Adapters, and setting
the display mode of the Color/Graphics Monitor
Adapter)**

MODE *n*

or

MODE [*n*],*m*[,T]

where:

n   is 40, 80, BW40, BW80, CO40, CO80, or MONO

40   sets the display width to 40 characters per line (for Color/Graphics Monitor Adapter).

80   sets the display width to 80 characters per line (for Color/Graphics Monitor Adapter).

BW40 switches the active display adapter to the Color/Graphics Monitor Adapter, and sets the display mode to Black and White (disables color) with 40 characters per line.

BW80 switches the active display adapter to the Color/Graphics Monitor Adapter, and sets the display mode to Black and White (disables color) with 80 characters per line.

CO40 switches the active display adapter to the Color/Graphics Monitor Adapter, enables color, and sets the display width to 40 characters per line.

CO80 switches the active display adapter to the Color/Graphics Monitor Adapter, enables color, and sets the display width to 80 characters per line.

MONO switches the active display adapter to the Monochrome Display Adapter (which always has display width of 80 characters per line).

MODE
Command

m   is **R** or **L** (shift display right or left).

T   requests a test pattern used to align the
display.

For readability, you can shift a display connected to
a color/graphics monitor adapter 1 character (for 40
columns) or 2 characters (for 80 columns) in either
direction. If you specify **T** in the MODE command,
a prompt asks you if the screen is aligned properly.
If you type **Y**, the command ends. If you type **N**,
the shift is repeated, followed by the same prompt.
For example,

```
mode 80,r,t
```

sets the mode of operation to 80 characters per line
and shifts the display 2 character positions to the
right. The test pattern is displayed, allowing the
opportunity to further shift the display without
having to enter the command again.

> **Note:**   Shifting the display causes all **MODE**
> resident code to be loaded.

Option 3 (For Asynchronous Communications Adapter)

MODE COM#[:]*baud*[,[*parity*][,[*databits*] [,[*stopbits*][,P]]]]

where:

is either 1, 2, 3 or 4 (Asynchronous Communications Adapter number).

baud   equals 110, 150, 300, 600, 1200, 2400, 4800, 9600 or 19200.

                Note: Only the first 2 digits of the baud rate are required; subsequent digits are ignored (baud 110 = 11, 19200 = 19).

parity   is either N (none), O (odd), or E (even)—(default = E).

databits   is either 7 or 8 (default = 7).

stopbits   is either 1 or 2 (if baud equals 110, default = 2; if baud does not equal 110, default = 1).

These are the *protocol* parameters. They are used to initialize the Asynchronous Communications Adapter. When you specify the protocol, you must specify at least the baud rate. The other parameters can be omitted, with the defaults accepted, by entering only commas. For example,

    mode com1:12,n,8,1,p

sets the mode of operation to 1200 baud rate, no parity, 8 databits, and 1 stopbit. To use the defaults listed in the definitions above, you enter:

MODE
Command

```
mode com1:12,,,,p
```

The *parity* defaults to even, the *databits* defaults to seven, and the *stopbits* defaults to one.

The **P** option indicates that the asynchronous adapter is being used for a serial interface printer. If you enter the **P**, time-out errors are continuously retried. You can stop the retry loop by pressing Ctrl-Break. To stop the time-out errors from being continuously retried when you have entered **P**, you must reinitialize the asynchronous adapter without entering the **P**. P option causes a portion of MODE to remain resident. Continuous retries on printers shared on the IBM PC Network may cause degradation on the performance of foreground tasks.

Option 4 (To redirect parallel printer output to an Asynchronous Communications Adapter)

MODE LPT#[:] = COM*n*

where:

is either 1, 2, or 3 (printer number).

n   is either 1, 2, 3 or 4 (Asynchronous Communications Adapter number).

All output directed to printer LPT# is redirected to the asynchronous adapter *n*.

> **Note:** Before you can use MODE to redirect parallel printer output to a serial device, you must initialize the Asynchronous Communications Adapter by using Option 3. If that serial device is a printer, your serial initialization command should also include the **P** parameter.

Option 5 (To prepare code pages)

MODE *device* CODEPAGE PREPARE = ((*cplist*)
[*d:*][*path*]*filename*[*.ext*])

or

MODE *device* CODEPAGE PREPARE =
((*cp*) [*d:*][*path*]*filename*[*.ext*])

where:

device   specifies one of CON, PRN, LPT1, LPT2, or LPT3.

cp   specifies one code page number.

cplist   specifies a list of code pages. The code page must be of the following values, 437, 850, 860, 863, or 865.

If a *cplist* is a list of code pages, the code pages must be enclosed in (and).

[d:][path]filename[.ext]
specifies the file containing the code pages. The code page information files provided on the DOS Start-Up Diskette have the extension of CPI.

- 4201.CPI - IBM Proprinter
- 5202.CPI - IBM Quietwriter III Printer
- EGA.CPI - EGA type devices
- LCD.CPI - IBM Convertible LCD

If a value is not specified for the code page position, the unspecified code page can then be enclosed by a pair of commas. For example:

MODE
Command

```
mode lpt1 cp prep=((850,,863) 4201.cpi)
```

specifies the first code page of 850, the second code
page remains the same as was previously prepared
for the LPT1, the third code page is specified as 863,
and the character shapes for IBM Proprinter Model
4201is specified.

If one of the code pages in the *cplist* is not defined in
the font file, or a wrong file has been used, all code
pages that correspond in position to the code pages
in the *cplist* will then become undefined.

Care should be used when preparing a code page that
is a hardware code page or the prepared code page
may replace the hardware code page.

For IBM Quietwriter III Printer Model 5202, when a
code page has been defined in the CONFIG.SYS as a
hardware code page, the code page does not need to
be prepared again.

For example:

```
mode con cp prepare=((850,,437) ega.cpi)
```

```
or
```

```
mode lpt1: cp prepare=((850,,437)c:\dos33
\4201.cpi)
```

```
or
```

```
mode lpt3: cp prep=((850 865) 4201.cpi)
```

Option 6 (To select or activate a code page)

MODE *device* CODEPAGE SELECT = cp

where:

cp   identifies the code page to be activated. Choose one of the following codes—437, 850, 860, 863 or 865. The value of cp must be one found in the list prepared by Option 5.

The device named CON or LPT# is set to the specified code page.

> **Note:** The specified code page must be one of the code pages in the *cplist* provided by the Option 5 MODE command for the same device.

```
mode lpt3: cp select=850
```

If the code page specified exists as both prepared and hardware code page, it is always the prepared code page that will be selected.

If a IBM Proprinter Model 4201 has a buffer created during start time by specifying a non-zero *n* in the DEVICE command, the images of the prepared code pages are then stored in the buffer. When a code page is selected, and the code page image has never been loaded onto the printer, or the code page image has been replaced by another previously selected code page then the code page image will be loaded onto the printer before the code page is activated.

For the IBM Quietwriter III Printer Model 5202, if after a code page has been selected and the printer sounds a beep, then you have to make sure the font

MODE
Command

cartridge of the selected code page has been installed, or if the cartridge of the selected code page has the typestyle that is currently being used for printing.

Option 7 (To display the currently active code page)

MODE *device* CODEPAGE [/*STATUS*]

The active code page and a list of selectable code pages for an active device such as CON: or LPT#: is displayed.

The list of code pages is divided into hardware, and the prepared code page sections. Those in the hardware section are the code pages defined as *hwcp* in the DEVICE command. Those in the prepared section are prepared through a MODE command.

Option 8 (To Refresh a code page)

This command re-establishes the active code page if its been lost. Code pages can be lost in different ways. One way is to turn off the printer. After turning off a printer and then on, a printer may have a different active code page than the active code page maintained by the printer driver. It is then necessary to do a refresh command to get back the original active code page. For example:

```
mode lpt1 cp prep=((860) c:\dos33\4201.cpi)
mode lpt1 cp refresh
```

The code page image for the IBM Proprinter Model 4201 will also be loaded into the printer, if a buffer has been created to hold the code page images.

Purpose:

Reads data from the standard input device, sends one screen of data to the standard output device, and then pauses with the message --**More**--.

Format:

[*d:*][*path*]MORE

Type:

Internal External

***

Remark:

Specify the parameters:

[*d:*][*path*] before MORE to specify the drive specifier and path that contains the MORE command file.

Pressing any character key causes another screen of data to be sent to the standard output device. This process continues until all input data is read.

MORE Filter
Command

Examples:

The following example displays the contents of the file TEST.ASM one screen at a time. When the screen is full, the message **--More--** appears on the bottom line. You can press any key to see the next screen.

```
A>more <test.asm
```

The following example pipes the output of the TREE command to the MORE filter. This is useful because when a full screen of output from TREE is displayed, the output pauses and the message --More-- is displayed. When you want to continue with the display, press any key.

```
A>tree ¦ more
```

Purpose:

NLSFUNC provides support for extended country information and allows you to use the CHCP command to select code pages for all devices defined as having code page switching support. NLSFUNC must be loaded prior to using the CHCP command. See the DEVICE command in Chapter 4.

Format:

[*d*:][*path*]NLSFUNC [[*d*:][*path*]*filename*[.*ext*]]

Type:

Internal External

***

Remark:

Specify the parameters:

[*d*:][*path*] before NLSFUNC to specify the drive specifier and path that contain the NLSFUNC command file.

[*d*:][*path*] *filename*[.*ext*] after NLSFUNC to specify the location and name of the country information file (COUNTRY.SYS). If this parameter is omitted, the drive path and file name defined by the COUNTRY= command in the CONFIG.SYS file are used. The file name must be included if drive or path are specified. For example:

```
nlsfunc c:\dir1\country.sys
```

loads the NLSFUNC command and specifies the location of the COUNTRY.SYS file in a directory called DIR1.

PATH (Set Search Directory) Command

Purpose:

Searches specified directories for commands or batch files that were not found by a search of the current directory.

Format:

PATH [[*d:*]*path*[[;[*d:*]*path*]]]

or

PATH ;

Type:

Internal External

***

Remark:

You may specify a list of drives and path names, separated by semicolons (note that path names must be specified and will not default to the current directory). Then, when you enter a command that is not found in the current directory of the drive that was specified (or implied) with the command, DOS searches the named directories in the sequence you entered them. The current directory is not changed.

Typing PATH with no parameters displays the current path. Typing PATH with only a semicolon (PATH ;) resets the search path to null (no extended search path). This is the default when DOS is started. In this case, DOS searches only the current directory for commands and batch files.

PATH (Set Search Directory) Command

Notes:

1. Erroneous information in the paths, such as invalid drive specifications or imbedded delimiters, will not be detected until DOS actually needs to search the specified paths.

2. If a path is specified that no longer exists at the time DOS uses it to search for a command or batch file, DOS ignores that path and goes on to the next.

3. PATH only finds files that can be executed; such as .COM, .EXE, and .BAT files. PATH will not find files with any other extensions.

4. A copy of the environment is saved with terminate and stay-resident programs. Invoking programs with a resident portion (MODE, PRINT, GRAPHICS) before a large path is set saves usable memory.

5. Terminate and stay-resident programs are loaded above the environment area so growth of the environment is limited to 128 bytes or the current size, whichever is greater.

Examples:

For the following examples, assume the program MYPROG.COM is only in directory MYDIR on drive B, and that the default drive is drive A.

The following example instructs DOS to look in the current directory of the specified drive, followed by A:\LEVEL2\LEVEL3, then B:\MYDIR for a command you specify.

```
A>path a:\level2\level3;b:\mydir
```

PATH (Set Search Directory) Command

If the command typed is *not* found in any of the directories specified in PATH, the following message is displayed:

Bad command or file name

In the previous example, if you type the command:

```
myprog
```

DOS searches the three specified directories, finding the program MYPROG in B:\MYDIR.

To display the current path, type:

```
path
```

The result is:

```
PATH=A:\LEVEL2\LEVEL3;B:\MYDIR
```

The following example causes DOS to search the current directory of C:, then D:\tools.

```
A>path c:;d:\tools
```

Purpose:

Prints a queue (list) of data files on the printer while you are doing other tasks on the computer.

Format:

[*d:*][*path*]PRINT [/D:*device*][/B:*buffsiz*]
[/U:*busytick*] [/M:*maxtick*][/S:*timeslice*]
[/Q:*quesiz*][/C][/T][/P][[*d:*][*path*]
[*filename*][.ext] . . .]

Type:

Internal External

***

Remark:

Specify the parameters:

[*d:*][*path*] before PRINT to specify the drive and path that contains the PRINT command file.

/D:*device* to specify the print device. If not specified, the default device PRN is assumed. /D can only be specified the first time PRINT is invoked.

Important: If you specify /D, it must be the first parameter.

/B:*buffsiz* to set the size in bytes of the internal buffer. The default value is 512 bytes. Increasing the value of **B** may enhance the performance of the PRINT command. /B can only be specified the first time PRINT is invoked.

PRINT
Command

/U:*busytick* to specify the number of clock ticks that
PRINT waits until the print device is available. /U
is called *busyticks*. The default value for busytick is
1. If PRINT waits longer than /U busyticks, it gives
up its time slice. The /U can only be specified the
first time PRINT is invoked.

/M:*maxtick* to specify how many clock ticks PRINT
can have to print characters on the print device. /M
is called *maxticks*. The default value for maxtick is 2
maxticks. The range of values is from 1 to 255
maxticks. This parameter does not need to be
specified each time you use PRINT. Specify it only
the first time.

/S:*timeslice* to specify the time slice value. The
default is 8 time slices. The range of values is 1 to
255. /S can only be specified the first time PRINT is
invoked.

/Q:*quesiz* to specify how many print files you can
have in the queue. The range of values is from 1 to
32 files. The default value is 10. /Q can only be
specified the first time PRINT is invoked.

/C to set the cancel mode. Allows you to select
which file or files to cancel. The preceding file name
and all following file names entered on the command
line are canceled from the print queue until a /P is
found on the command line, or until you press the
Enter key.

/T to set the terminate mode. All queued files are
canceled from the print queue. If a file is currently
being printed, the printing stops, a cancelation
message is printed, the paper is advanced to the next
page, and the printer's alarm sounds.

/P to set the print mode. The preceding file name
and all following file names are added to the print

queue until a /C is found on the command line, or until you press the Enter.

The parameters /D, /B, /Q, /S, /U, and /M can only be specified the first time you use PRINT. If you specify them again, the following message is displayed:

Invalid parameter

You can enter more than one file name on the command line, each with appropriate parameters. Global file name characters * and ? are allowed in the file name. Once a file has been queued, you can change the current directory without affecting the printing of the files already in the print queue.

The first time this command is issued, it increases the resident size of DOS in memory.

If no parameters are specified and you press Enter, the files listed on the command line are queued for printing (/P is assumed).

If PRINT is typed with no parameters, PRINT displays the names of the files currently in the print queue.

If you did not specify the device name using /D the first time the PRINT command is executed after you start your system, the following message is displayed on the display screen:

```
Name of list device [PRN]:
```

This allows you to specify the output list device—LPT1, LPT2, LPT3, PRN, COM1, COM2, COM3, COM4, AUX, etc. The default is PRN, and it will be selected if you press Enter.

PRINT
Command

Note: Be sure the device you name is physically attached to your system; naming a nonexistent device will cause unpredictable system behavior.

The files are queued for printing in the order entered. After each file is printed, the printer paper is advanced to the next page. Any tab characters found are expanded with blanks to the next 8 − column boundary.

If PRINT encounters a disk error while attempting to read the file to be printed, PRINT will cause:

• The file currently printing to be canceled

• The disk error message to be printed on the printer

• The printer paper to be advanced to the next page and the alarm to be sounded

• The remaining files in the print queue to be printed

If the /T or /C parameters are used to cancel a file or files currently being printed:

• The printer alarm sounds.

• A file cancelation message prints on the printer. If /T, the following message prints:

All files canceled by operator.

If /C, the name of the canceled file is printed followed by this message:

File canceled by operator

- The printer paper advances to the next page.

- If all files in the print queue have not been canceled, printing resumes with the first file remaining in the print queue.

Notes:

1. The disk containing the files being printed must remain in the specified drive until all printing is complete. Any file in the print queue must not be altered or erased until after it has been printed.

2. The printer cannot be used for any other purpose while PRINT has data to print. Any attempt to use the printer (Shift – PrtSc, LLIST, Ctrl – PrtSc, LPRINT, etc.) results in an "out – of – paper" indication until all files have been printed or printing is terminated (/T).

3. You cannot use PRINT on a network server computer.

4. PRINT expands global file name characters and builds the full path including the drive specifier, for each file to be printed. This string must be less than 63 characters.

Examples:

In this example, the PRINT command is being used for the first time since the system was started. The command:

```
print a:temp1.tst
```

has just been entered, and DOS responds with:

```
Name of list device [PRN]:
```

Press the Enter key to send output to the printer.

PRINT
Command

DOS then sends the file TEMP1.TST from drive A
to the print queue and sends the output to the device
"PRN" printer. The command:

```
print /t
```

empties the print queue. Any other information on
the line is ignored. The command:

```
print temp.*/c
```

removes all TEMP.??? files from the print queue that
have the same drive letter as the default drive. The
command:

```
print a:temp1.tst/c a:temp2.tst a:temp3.tst
```

removes the three files TEMP1, TEMP2, and
TEMP3 on drive A from the print queue. The
command:

```
print temp1.tst/c temp2.tst/p temp3.tst
```

removes file TEMP1.TST from the print queue and
adds the files TEMP2.TST and TEMP3.TST to the
print queue. The command:

```
print temp1.tst temp2.tst temp3.tst/c
```

adds files TEMP1.TST and TEMP2.TST to the print
queue, then removes TEMP3.TST from the print
queue.

Purpose:

Sets a new DOS prompt.

Format:

PROMPT [*prompt – text*]

Type:

Internal External

***

Remark:

Specify the parameter:

prompt – text to specify the text for the new system prompt. The prompt – text can contain special meta – strings that are in the form $*c*. The following are meta – strings that can be included in the prompt – text:

$ The $ character.
t   The time.
d   The date.
p   The current directory of the default drive.
v   The version number.
n   The default drive letter.
g   The > character.
l   The < character.
b   The ¦ character.
q   The = character.
h   A backspace; the previous character is erased.
e   The ESCape character.
_   The CR LF sequence (go to beginning of new line on the display screen).

PROMPT (Set System Prompt) Command

Any other value for c is treated as a null character and is ignored by PROMPT.

Type PROMPT with no parameters to reset the prompt to the normal DOS prompt.

Examples:

The following example sets the DOS prompt to the default drive letter plus the character > .

```
A>prompt $n$g
```

The following example sets the DOS prompt to the message HELLO.

```
A>prompt HELLO
```

The following example sets the DOS prompt to the current directory of the default drive plus the > character.

```
A>prompt $p$g
```

> **Note:** Include this statement in an AUTOEXEC.BAT file so that every time you start DOS, the DOS prompt tells you what directory you are in (the current directory).

If the current directory of drive A is \LEVEL1, the DOS prompt would display:

```
A:\level1>
```

The following example sets the DOS prompt to display the date and time as follows:

Time = (current time)

Date = (current date)

```
A>prompt time = $t$_date = $d
```

PROMPT (Set System Prompt) Command

If you want to create a prompt that begins with any of the DOS command delimiters (such as semicolon or blank), you can precede that character with a null meta − string. In this case, the character is treated as the first character of the prompt, rather than as a delimiter between the word PROMPT and its parameter. For example:

```
A>prompt $a;abc
```

causes the PROMPT command to interpret the $A as a null character, because A is not one of the defined characters in the above list. All characters following the null character become the new system prompt.

You can use the PROMPT command to issue escape sequences to ANSI.SYS. If you started your system with the command, DEVICE = ANSI.SYS in your CONFIG.SYS file, the following example displays the current directory on the top row of the screen, and a minus - on the current line.

```
A>prompt $e[ks$e[24A$p$e[u-
```

The A in the escape sequence must be uppercase. See Chapter 3, "Using Extended Screen and Keyboard Control" in the *DOS Technical Reference*.

Notes:

1. A copy of the environment is saved with terminate and stay-resident programs. Invoking programs with a resident portion (MODE, PRINT, GRAPHICS) before a large path is set saves usable memory.

2. Terminate and stay-resident programs (GRAPHICS, PRINT, MODE) are loaded above the environment area so growth of the environment is limited to 128 bytes or the current size, whichever is greater.

RECOVER
Command

Purpose:

Recovers files from a disk that has a defective sector. You can recover the file that contains the bad sector (minus the data in the bad sector). Or, all the files on the disk can be recovered if the directory has been damaged. The disk is marked to indicate where the bad sectors were found.

Format:

[*d:*][*path*]RECOVER [*d:*][*path*]*filename*[*.ext*]

or

[*d:*][*path*]RECOVER *d:*

Type:

Internal External

***

Remark:

Specify the parameters:

[*d:*][*path*] before RECOVER to specify the drive and path that contains the RECOVER command file.

[*d:*][*path*]*filename*[*.ext*] to specify the name of the file you want to recover.

Use the first RECOVER format to recover the specified file. If you do not specify a drive, the default drive is used. If you do not specify a path, the current directory is used. The size of the recovered file is a multiple of the DOS allocation unit size. In most cases, this is larger than the

original file size. The data in the bad sector is not recovered.

Use the second RECOVER format to recover all files.

If the sum of the number of files in the root and the number of files in subdirectories is greater than the possible number of entries in the root (112 for double-sided diskettes), you have to do multiple recovers to save the entire disk. Issue RECOVER using the second format to recover as many entries as will fit in the root directory. Examine the recovered files and copy the ones you want to save to another disk. Delete some or all of the files you have already recovered from the damaged disk from which you are recovering. Issue RECOVER again to recover more files. Continue this procedure until all files are recovered.

This form of the RECOVER command should only be used if the directory of the disk has become unusable. Because RECOVER has no way to know whether the data in the directory is valid or not, it *must* assume that the entire directory is invalid, and therefore recovers all files into file names of the form shown below, including any files for which there may still have been valid directory entries.

Text files will normally require re — editing to remove unwanted data from the end of the recovered file before they can be used for normal processing.

> **Note:** You cannot use the RECOVER command on a network disk.

RECOVER
Command

Examples:

The following example recovers the file **MYPROG** from the disk in drive A.

```
A>recover a:myprog
```

The disk file **MYPROG** on drive A is read sector-by-sector, skipping the bad sectors.

The following example recovers the contents of an entire disk from drive A.

```
A>recover a:
```

The disk file allocation table on drive A is scanned for chains of allocation units. A directory is created for each chain of allocation units in the form:

```
FILEnnnn.REC
```

Where *nnnn* is a sequential number starting with 0001. Each FILE*nnnn*.REC points to one of the recovered files on the disk.

RENAME (or REN) Command

COMMANDS

Purpose:

Changes the name of the file specified in the first parameter to the name and extension given in the second parameter.

Format:

REN[AME] [*d:*][*path*] *filename*[.*ext*] *filename*[.*ext*]

Type:

Internal External

***

Remark:

You can use the abbreviated form REN for the RENAME command. You can also use the global characters ? and * in the parameters. For more information about global characters, refer to "Global File Name Characters" in Chapter 2. A path can be specified only with the first file name; the file will remain in the same directory after its name has been changed.

Examples:

The following example renames the file ABODE on drive B to HOME.

```
A>rename b:abode home
```

RENAME (or REN)
Command

The following example renames the file ABODE on drive B to ABODE.XY.

```
A>ren b:abode *.xy
```

The following example renames the file MYPROG.COM in the directory \LEVEL1 on drive B to YOURPROG.COM.

```
A>ren b:\level1\myprog.com yourprog.com
```

Purpose:

Selectively replaces files on the target with files of the same name from the source. Selectively add files from the source to the target.

Format:

*[d:][path]*REPLACE *[d:] [path]filename [.ext]*
[d:][path] [/A][/P][/R][/S][/W]

Type:

Internal External

***

Remark:

Specify the parameters.

[d:] [path] before REPLACE specifies the drive and path that contains the REPLACE command file, if it is not in the current directory of the default drive.

[d:] [path]filename [.ext] specifies the names of the files on the source that are to be replaced on the target or added to the target. The file name can contain global file name characters.

[d:][path] specifies the target drive and directory. The files in this directory are the ones that are to be replaced, if /A is specified the source files are copied to this directory. The default is the directory on the current drive.

/A REPLACE copies all files specified by the source that do not exist on the target. This allows you to add files to the target without overwriting the

REPLACE
Command

files that already exist on the target. You cannot use /A and /S together.

/P REPLACE prompts you as each file is encountered on the target, this allows selective replacing or adding.

/R REPLACE replaces files that are read−only on the target.

/S REPLACE searches all directories of the target for files matching the source file name. You cannot use /A and /S together.

/W REPLACE is instructed to wait for you to insert a diskette, before beginning to search for source files. If you specified /W and did not specify /A, the following message is displayed:

```
Press any key to begin replacing file(s)
```

If you specified /W and /A the following message is displayed:

```
Press any key to begin adding file(s)
```

If you did not specify /W on the command line, then REPLACE begins immediately.

Examples:

Assume you have changed the file "PE.PRO" in your "C:\EDITORS.DIR" subdirectory. To replace all the other copies of "PE.PRO" on your fixed disk (C) enter the following command line:

```
replace c:\editors.dir\pe.pro c:\ /s /p
```

The target path from the root is built, and the global file name characters are expanded. The complete string containing the target drive specifier, the path, and the expanded file name cannot be greater than 63 characters.

Hidden and system files are not found on the source and are not replaced on the target.

REPLACE returns an ERRORLEVEL equivalent to the DOS error code. Some of the most common return codes are listed on the following page. Refer to the "Extended Error Codes" in the "Error Return Information" section of the *DOS Technical Reference* Chapter 6 for all possible return codes.

REPLACE
Command

Return Code	Error	Explanation
2	File not found	No source file(s) were found.
3	Path not found	The source or target path was invalid or not found.
5	Access denied	The access code for reading or writing a file is not correct for accessing the file. Try again, using /R.
8	Insufficient memory	
11	Invalid format	The command line was not correct due to an invalid parameter, incorrect number of parameters, etc.
15	Invalid drive was specified	
22	Unknown command	Incorrect version of DOS

Purpose:

Restores one or more backup files from a disk to another disk.

Format:

[d:][*path*]RESTORE *d*: [*d*:][*path*]*filename*[*.ext*]
[/S][/P][/B:*mm-dd-yy*][/A:*mm-dd-yy*][/M][/N]
[/L:*time*][/E:*time*]

Type:

Internal External

***

Remark:

Specify the parameters:

[*d*:][*path*] before RESTORE to specify the drive and path that contains the RESTORE command file.

d: to specify the drive that contains the BACKUP files (source).

[*d*:][*path*]*filename*[*.ext*] to specify where you want to restore the files and what files from the source you want to restore.

/S to restore all files in subdirectories in addition to the files in the specified directory. This includes subdirectories at all levels beyond the specified directory.

/P to have RESTORE prompt you before restoring files that have changed since they were last backed up, or that are marked read – only. You can then choose to restore the file or not. Read – only is a file

RESTORE
Command

attribute that you can set by using the ATTRIB command. The two DOS system files (IBMBIO.COM and IBMDOS.COM) are marked read – only when they are created by the FORMAT and SYS commands.

/B to restore all files modified on or before the date specified by *mm-dd-yy*. *mm-dd-yy* is entered in the current date format.

/A to restore all files modified on or after the date specified by *mm-dd-yy*. *mm-dd-yy* is entered in the current date format.

/M to restore files modified or deleted since they were backed up.

/N to restore files that no longer exist on the target.

> **Note:** /B, /A and /N should not be used together.

/L restores only those files that were modified at or later than the given time.

/E restores only those files that were modified at or earlier than the given time.

The files being restored must have been placed on the source with the BACKUP command.

Files are restored to the current directory if you do not specify a path. If you specify a path, you must also specify a file name. The files must be restored to the same directory they were in when BACKUP copied them.

Global file name characters are allowed in the file name and cause all of the files matching the file name to be restored.

When RESTORE prompts you to insert the source, make sure you insert the first diskette that might contain the file you want to restore. If you are not sure, insert source number 1. If the file is not on the diskette you inserted, RESTORE prompts you to insert the next source.

If you are sharing files, you can only restore files that you have access to. If you attempt to access a file that you do not have access to, the following message is displayed:

```
PATHNAME\FILENAME
Not able to restore at this time
```

If you use global file name characters, RESTORE prompts you to insert the next diskette after it has restored all files on the backup diskette that match the specified file name.

RESTORE does not restore the files IBMBIO.COM, IBMDOS.COM, and COMMAND.COM. Therefore, RESTORE cannot be used to create a bootable disk or diskette. We recommend that you use the SYS command and then copy the current version of COMMAND.COM to the root directory before restoring if you want the disk to be bootable.

The RESTORE command sets the ERRORLEVEL (see Batch File Commands) as follows:

0   Normal completion

1   No files were found to restore

2   Some files not restored due to sharing conflicts

RESTORE
Command

3   Terminated by user (Ctrl – Break or ESC)

4   Terminated due to error

These codes can be used with the batch processing IF subcommand to control subsequent error level processing.

Examples:

The following example restores all files (including subdirectories /S) on the backup diskettes to fixed disk drive C.

```
A>restore a: c:\*.*  /s
```

The following example restores files that have a file name extension of .DAT from the backup diskette in drive A.

```
A>restore a: c:*.dat
```

The following example restores three different files from the backup diskettes to the default fixed disk drive:

```
C>restore a: \level1\file1.dat
C>restore a: \level1\level2\file2.dat
C>restore a: \level1\level3\file3.dat
```

The following example restores all files from the backup disk drive C, and prompts you if any files on drive C have changed since the last backup or if any files are marked read – only (/P).

```
A>restore c:/p
```

Important: Do not RESTORE if a JOIN, ASSIGN, or SUBST was in effect during the BACKUP.

Do not use the RESTORE command while APPEND is in effect.

Purpose:

Removes a subdirectory from the specified disk.

Format:

RMDIR [*d:*]*path*

or

RD [*d:*]*path*

Type:

Internal External

***

Remark:

The directory must be empty before it can be removed with the exception of the "." and ".." entries. You cannot remove subdirectories that contain hidden files. The last directory name in the path is the directory to be removed.

Note: The root directory and the current directory cannot be removed.

Examples:

The following example removes the entry for LEVEL2 from the directory LEVEL1.

```
A>rd b:\level1\level2
```

Note: Exercise care in using RMDIR while a JOIN or an ASSIGN is in effect. You cannot remove a directory if it has been substituted (SUBST).

SELECT
Command

Purpose:

Installs DOS on a new disk with the keyboard layout, date and time format you select.

CAUTION
SELECT is only for use on new media. Since the FORMAT command is used, all data on the target media is destroyed.

Format:

[*d:*][*path*]SELECT [[A:|B:][*d:*][*path*]] *xxx yy*

Type:

Internal External

***

Remark:

Specify the parameters:

[*d:*][*path*] before SELECT to specify the drive and path that contain the SELECT command file.

[A:|B:] to specify the source drive. If a source drive is not specified, drive A is used as the source drive. Only A and B are valid source drives. The target drive must be specified if source drive is specified.

[*d:*][*path*] to specify the target drive and path where the DOS command files are copied to. If a target drive is not specified, drive B is used as the target drive. If a path is not specified, the DOS command files are placed in the root directory on the target. The target drive must be different from the source drive.

SELECT
Command

If only one drive specification is entered, it is used as the target drive.

xxx to specify the country code. The country code tells DOS the date, time, collating sequence, capitalization, and folding format for a given country. Choose the value for *xxx* from the "Country and Keyboard Codes" table in Appendix B.

yy to specify the keyboard code. The keyboard code tells DOS which keyboard layout you want to use. Choose the value for *yy* from the "Country and Keyboard Codes" table in Appendix B.

- SELECT uses the FORMAT command to prepare the target disk and then executes the XCOPY command to copy the DOS command files from the DOS Start-Up Diskette or the DOS Start-Up/Operating Diskette to the target disk. SELECT then creates an AUTOEXEC.BAT file and a CONFIG.SYS file.

- This prompt appears before SELECT starts executing:

```
SELECT is used to install DOS the first
time.  SELECT erases everything on the
specified target and then installs DOS.
Do you want to continue (Y/N)?  Y
```

- The DOS Start-Up Diskette or the DOS Start-Up/Operating Diskette should be in the source drive when SELECT is executed.

- When performing the SELECT procedure to a high-capacity drive, you *must* use a high-capacity diskette.

- For fixed disks, FORMAT is executed with the /V option, allowing you to enter a volume label.

SELECT
Command

- Paths must be specified from the root. The entries . and .. are not allowed in the path. All subdirectories in the path are created.

- A CONFIG.SYS file is created on the target with the following command:

  COUNTRY=*xxx*

- An AUTOEXEC.BAT file is created on the target with the following commands:

  PATH \;[*path*;]
  KEYB *yy xxx*
  ECHO OFF
  DATE
  TIME
  VER

  For fixed disks, the PATH command includes the target drive letter.

  Note: We do not recommend installing SELECT in a subdirectory on the target diskette with less than 720KB.

Purpose:

This command inserts strings into the command processor's environment. A copy of the entire series of strings in the environment is made available to all commands and applications.

Format:

SET [*name* = [*parameter*]]

Type:

Internal External

***

Remark:

The entire string (beginning with *name*) is inserted into a block of memory reserved for environment strings. Any lowercase letters in the name are converted to uppercase letters when added to the environment (including foreign language characters); the remainder of the line is inserted as you typed it. If the name already exists in the environment, it is replaced with the new *parameter*.

If the SET command is typed with no *name* specified, then the current set of environment strings is displayed.

If a *name* is specified, but the *parameter* is not specified, then the current occurrence of *name* = *parameter* is removed from the environment.

A copy of the environment (series of names and parameters) is made available to all DOS commands and applications (see "Program Segment Prefix" in Chapter 7 of the *DOS Technical Reference*).

SET (Set Environment) Command

Notes:

1. DOS automatically adds any PROMPT or PATH commands to the environment when you enter them. You do not need to use the SET command to add either of these two commands to the environment.

2. One of the strings in the environment (placed there by DOS when it starts up) will always be a COMSPEC = parameter. That parameter describes the path that DOS uses to reload the command processor when necessary. You should always include a drive letter in the path used to describe the location of COMMAND.COM.

3. If you have *not* loaded a program that remains resident (such as MODE, PRINT, or GRAPHICS), DOS expands the environment string area to hold additional strings. If you *have* loaded a program that remains resident, DOS is unable to expand the environment area beyond 127 bytes. If the environment area has already expanded beyond 127 bytes when you load a program that is to remain resident, DOS is unable to expand the environment area beyond that point. The message **Out of environment space** appears if you issue a SET command that would cause the combined environment strings to exceed 127 bytes. The SHELL = command of CONFIG.SYS can be used to increase the environment size.

4. A copy of the environment is saved with terminate and stay-resident programs. Invoking programs with a resident portion (MODE, PRINT, GRAPHICS) before a large environment is set saves usable memory.

5. The value of an environment string can be replaced in any DOS command in a batch file by entering %name%. For additional information refer to Batch File Commands, "Using Environment Variables" in this chapter.

Examples:

This example adds the string PGMS = \LEVEL1 to the environment. When an application program receives control, it could search the environment for the name PGMS, and use the supplied parameter as the directory name to use for its files:

```
set pgms=\level1
```

The following example removes PGMS = \LEVEL1 from the environment:

```
set pgms=
```

You can select the strings in the environment. For example, typing:

```
set abc=xyz
```

adds the string ABC = xyz to the other strings already in the environment (note the conversion of abc to uppercase ABC). In this way, it is possible for you to type keywords and parameters that are not meaningful to DOS, but can be found and interpreted by applications designed to examine the environment.

SHARE
Command

Purpose:

Loads support for file sharing and diskette change protection.

> **Note:** Refer to Int 21H function calls 3DH and 5CH in Chapter 6 of the *DOS Technical Reference* for more information on file sharing and locking.

Format:

[*d:*][*path*]SHARE [/F:*filespace*][/L:*locks*]

Type:

Internal External

***

Remark:

Specify the parameters:

[*d:*][*path*] before SHARE specifies the drive and path that contains the SHARE command file.

/F:*filespace* allocates file space in bytes for the area used to record the information necessary for file sharing. Each open file requires the length of the full file name plus 11 bytes. The default value is 2048 bytes.

/L:*locks* allocates space for the number of locks you want. The default value is 20 locks.

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If you load SHARE, all read or write requests are validated against the file sharing code. If filesharing is installed and you try to re-install it, the following message is displayed:

Share Already Installed

Some diskette drives can sense that the drive door has been opened. SHARE contains additional logic to detect that the door on such drives has been opened during a critical operation. If the drive is opened before DOS has completed a read or write, DOS checks the volume label of the diskette currently in the drive. If the diskette in the drive is not the expected diskette, DOS issues an invalid disk change message requesting that the appropriate diskette be inserted. When the correct diskette is inserted the I/O operation can be safely completed.

Examples:
The following example loads file sharing support.

```
A>share
```

Note: If you load SHARE, the table for FCB control is checked. If you specified FCBS = 4,0 (the default) in CONFIG.SYS, the table is adjusted to 16, 8.

SORT Filter
Command

Purpose:

Reads data from the standard input device, sorts the data, then writes the data to the standard output device.

Format:

[*d*:][*path*]SORT [/R] [/+ *n*]

Type:

Internal External

***

Remark:

Specify the parameters:

[*d*:][*path*] before SORT to specify the drive and path that contains the SORT command file.

/R to sort in reverse order. For example, Z comes before A.

/ +*n* to start sorting with column *n*. The *n* is an integer value. If you do not specify *n* the default is column 1. The maximum file that you can sort is 63K.

The output file name must be different than the input file name.

Notes:

Characters are sorted according to their binary value with the following exceptions:

1. Lowercase letters a-z are equated to uppercase A-Z.

2. Characters above 127 are collated according to rules based on the currently selected country code (see Chapter 4, COUNTRY =).

The following example reads the file UNSORT.TXT, sorts it in reverse order, and then writes the output to the file SORT.TXT.

```
sort /r <unsort.txt >sort.txt
```

The following example pipes the output of the DIR command to the SORT filter. Then the directory listing is sorted starting with column 14 (column 14 contains the file size). The output is sent to the standard input device.

```
dir ¦ sort /+14
```

Sorting a Directory Listing by Month and Year

The proper way to achieve order by month and year is to sort the directory by month:

```
SORT /+24
```

and save the file. To avoid equivalent years being ordered by time, you must delete all characters following the year, being sure not to introduce tabs. Then sort the edited files by year.

```
SORT /+30
```

SUBST(Substitute)
Command

Purpose:

Allows you to use a different drive specifier to refer to another drive or path.

> **Note:** If you use applications that do not recognize paths, SUBST allows you to specify a drive letter for a path.

Format:

[*d:*][*path*]SUBST *d:* *d:path*

or

[*d:*][*path*]SUBST *d:* /D

or

[*d:*][*path*] SUBST

Type:

Internal External

***

Remark:

Specify the parameters:

[*d:*][*path*] to specify the drive and path that contain the SUBST command file.

d: specifies the drive letter that you want to use to refer to another drive or path.

d:path to specify the drive or path that you want to refer to with a nickname.

/D to delete a substitution. You must specify the letter of the drive whose substitution you want to delete. For example, if you substituted the drive letter G for the path C:\LEVEL1, you can remove the substitution by typing:

```
subst g: /d
```

Notes:

1. The first drive letter you specify depends on the value of the LASTDRIVE configuration command. If you do not specify the LASTDRIVE command in your CONFIG.SYS file, the default value is LASTDRIVE = E. This means that you can substitute the drive letters A through E. To specify a drive letter greater than E, set LASTDRIVE equal to a letter A - Z. For example, to SUBST the drive letter G, the LASTDRIVE command must be greater than or equal to G. Refer to Chapter 4 "Configuring Your System" for more information on the LASTDRIVE command.

   You can think of this drive letter as a "nickname" for a drive or path that you can access. For example, if you substitute the drive letter G for the path C:\LEVEL1\LEVEL2 to refer to C:\LEVEL1\LEVEL2\FILE1, you can type:

```
dir g:file1
```

   instead of typing:

```
dir c:\level1\level2\file1
```

2. The drive specifiers for both drives specified must be different.

SUBST(Substitute)
Command

3. The first drive letter specified cannot be the same as the default drive.

4. Neither parameter can refer to a network drive. If you do refer to a network drive, the message "Cannot SUBST a network drive" appears.

5. The following commands should be used with care while a substitution is in effect: CHDIR, MKDIR, RMDIR, and PATH.

6. The following commands should *not* be used while a substitution is in effect: ASSIGN, BACKUP, DISKCOMP, DISKCOPY, FDISK, FORMAT, JOIN, LABEL, and RESTORE.

7. Type SUBST with no parameters to display the current substitutions. The output is displayed in this form:

```
G: => D:\PATH
```

8. The message **Invalid Parameter** is displayed if:

   You type an incorrect drive specifier

   You try to substitute the default drive

   You specify /D without specifying the drive letter

9. The message **Invalid Path** is displayed if you specify a path that doesn't exist.

Examples:

For the following examples, assume:

- The default drive is drive B

- The current directory of drive C is C:\REPORTS\FILES

- LASTDRIVE = H

```
                    ┌─────────┐
                    │   C:\   │
                    └─────────┘
          ┌──────────────┴──────────────┐
    ┌──────────┐                    ┌─────────┐
    │ REPORTS  │                    │  GAMES  │
    └──────────┘                    └─────────┘
          │
    ┌──────────┐
    │  FILES   │
    └──────────┘
```
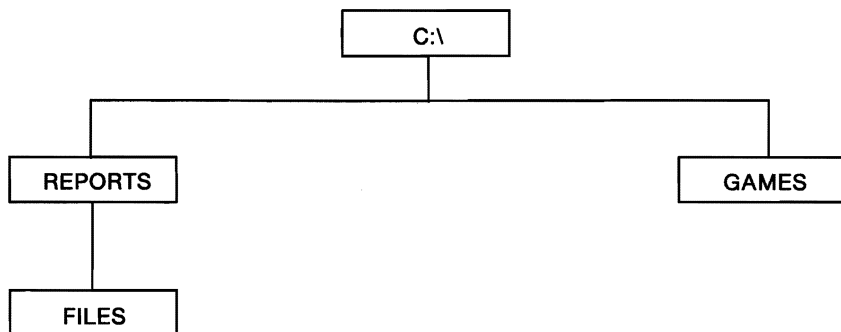
Creating a Substitution

The following example substitutes drive G for the path C:\REPORTS\FILES

```
B>subst g:  c:\reports\files
```

If you want to list the directory of C:\REPORTS\FILES, type:

```
dir g:
```

Remember, the drive specifiers must be less than or equal to the value specified for LASTDRIVE in your CONFIG.SYS file. For example, for drive G to be

SUBST(Substitute) Command

valid, the LASTDRIVE command must be greater than or equal to g (LASTDRIVE = g).

Displaying the Current Substitutions

The following example displays the current substitutions:

```
B>subst
```

The following is displayed:

```
G: =>  C:\REPORTS\FILES
```

The message indicates that drive G is substituted for the path C:\REPORTS\FILES. Now when you refer to drive G, the directory C:\REPORTS\FILES is used.

Deleting a Substitution

The following example removes the substitution as it appeared in the previous example:

```
subst g: /d
```

Why Use SUBST?

Substituting a drive letter for a path can be useful if you use applications that do not recognize paths. For example, if you want to edit the file RECIPES in the directory C:\FOOD\FILES, you can substitute the drive letter **F** for this directory path. Then when you want to edit RECIPES use the drive letter **F** instead of the path C:\FOOD\FILES. You can then refer to the file as F:RECIPES. Remember, you must have LASTDRIVE = F to do this substitution.

SYS (System) Command

Purpose:

Transfers the operating system files—IBMBIO.COM and IBMDOS.COM— from the default drive to the drive specified.

Note: SYS does not transfer the file COMMAND.COM. You must copy this file to the root directory of the disk.

Format:

[d:][path]SYS d:

Type:

Internal External

***

Remark:

Specify the parameters:

[d:][path] before SYS to specify the drive and path that contains the SYS command file.

d: to specify the disk drive that you want to transfer the operating system files to.

The directory of the disk in the specified drive must be completely empty, or the disk must have been formatted by a FORMAT d:/S or FORMAT d:/B command to contain directory entries for the DOS files IBMBIO.COM and IBMDOS.COM. This is necessary because DOS startup requires these files to occupy the first two directory entries, and because IBMBIO.COM must start at the beginning of the data area on the disk.

SYS (System) Command

Notes:

1. SYS lets you transfer a copy of the operating system files to an application program diskette designed to use DOS, but sold without it. In this case, the space required for the DOS files has already been allocated, although the DOS files are not actually present. The SYS command transfers the files to the allocated space.

2. You cannot use the SYS command on a network drive.

Purpose:

Permits you to enter or change the time known to the system. Whenever you create or add to a file, the time is recorded in the directory. You can change the time from the console or from a batch file. On machines with permanent clocks, the clock time is also changed.

Format:

TIME [*hh:mm*[:*ss*[.*xx*]]]

Type:

Internal External

***

Remark:

Specify the parameters:

hh to specify the hours. Type one or two numbers from 0 to 23 for the hours.

mm to specify the minutes. Type one or two numbers from 0 to 59 for the minutes.

ss to specify the seconds. Type one or two numbers from 0 to 59 for the seconds.

xx to specify the hundredths of a second. Type one or two numbers from 0 to 99 for hundredths of a second.

TIME
Command

Notes:

1. If you type TIME with no parameters, the
   following prompt is displayed:

   ```
   Current time is hh:mm:ss.xx
   Enter new time:_
   ```

   To leave the time as is, press Enter. To change
   the time, type the new time and press Enter.

2. Separate the hours, minutes, and seconds using a
   colon (:) or period (.). Separate the seconds and
   hundredths of a second with a period (.) or a
   comma (,), depending on the decimal separator
   that is displayed on the screen.

3. If you type a valid time, the new time is accepted
   and the DOS prompt is displayed. If the time is
   invalid, the following prompt is displayed:

   ```
   Invalid time
   Enter new time_
   ```

4. If you type any information (for example, just the
   hours and minutes, and press Enter), the
   remaining fields are set to zero.

5. Any time is acceptable as long as the digits are
   within the defined ranges.

6. You can change the format of the time by using
   the COUNTRY configuration command. Refer
   to Chapter 4 "Configuring Your System" for
   information on the COUNTRY command.

Examples:

The following example sets the time to 13:55:00.00.

```
A>time
Current time is 00:25:16.65
Enter new time: 13:55

A>_
```

TREE
Command

Purpose:

Displays all of the directory paths found on the
specified drive, and optionally lists the files in the
root directory and each subdirectory.

Format:

[*d:*][*path*]TREE [*d:*][/F]

Type:

Internal External

***

Remark:

Specify the parameters:

[*d:*][*path*] before TREE to specify the drive and path
that contains the TREE command file.

[*d:*] to specify the drive whose directory paths you
want to display. If not specified, the default drive is
used.

[/F] to also display the names of files in the root
directory and in all subdirectories.

For each directory found, its full path name is
displayed, along with the names of any directories
defined within it (these are called subdirectories in
the output). To pause the screen output, use the
Pause Screen function or pipe the output to the
MORE filter. For more information on the Pause
Screen function see chapter 2 of the "Users Guide."

Examples:

The following example lists all the directory paths and the names of all files in the root directory and each subdirectory on drive B. The output is placed in the file TREE.LST in the current directory of drive A.

```
A>tree b:/f >tree.lst
```

Following is an example of a directory path listing. If the disk called MYDISK in drive A had the following directory structure:

```
                    ┌──────────────┐
                    │   ROOT DIR   │
                    └──────────────┘
          ┌───────────────────┴───────────────────┐
   ┌──────────────┐                         ┌──────────────┐
   │   SOURCE     │                         │   LEVEL2     │
   └──────────────┘                         └──────────────┘
      MYPROG1.ASM                              No files
      MYPROG2.ASM                                 │
                                           ┌──────────────┐
                                           │   LEVEL3     │
                                           └──────────────┘
                                              MYPROG1.EXE
```
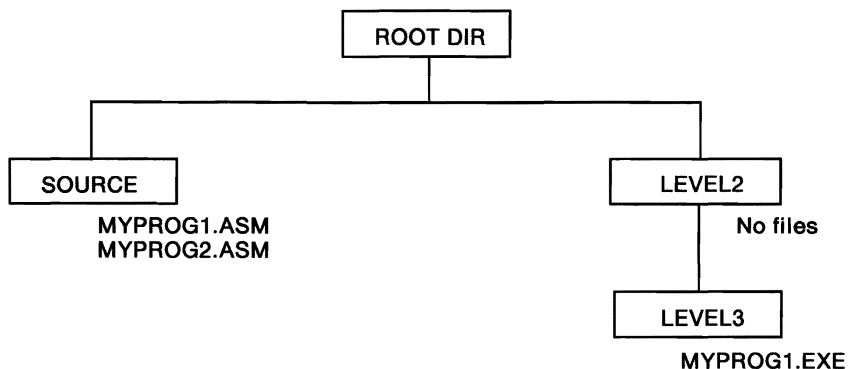
TREE
Command

Then TREE /F would display:

```
DIRECTORY PATH LISTING FOR VOLUME MYDISK

Files:          None

Path: \SOURCE

Subdirectories: None

Files:          MYPROG1 .ASM
                  MYPROG2 .ASM


Path: \LEVEL2

Subdirectories: LEVEL3

Files:          None


Path: \LEVEL2\LEVEL3

Subdirectories: None

Files:          MYPROG1 .EXE
```

The following example lists all the directory paths
and file names of the root directory and of all
subdirectories on drive A. The output is sent to the
printer.

```
A>tree a:/f >prn
```

Purpose:

Displays the contents of the specified file on the standard output device.

Format:

TYPE [*d:*][*path*]*filename*[*.ext*]

Type:

Internal External

***

Remark:

The data is unformatted except that tab characters are expanded to an 8 − character boundary; that is, columns 8, 16, 24, etc.

Notes:

1. Use the Print Screen function to print the contents of a file as it is displayed. You can also redirect the output to a file or the printer.
2. Text files appear in a legible format; however, other files, such as object program files, may appear unreadable due to the presence of nonalphabetic or nonnumeric characters.
3. Global file name characters are not allowed in the file name or extension.

Examples:

The following example displays the file MYFILE.ONE on drive B on the standard output device.

```
A>type b:myfile.one
```

VER (Version)
Command

Purpose:

Displays the DOS version number that you are working with on the standard output device.

Format:

VER

Type:

Internal External

    ***

Remark:

The DOS version consists of a single – digit major version number, followed by a period, followed by a two – digit minor version number.

Examples:

The following example displays the current DOS version number:

```
A>ver
```

The result is:

```
IBM Personal Computer DOS Version 3.30
```

The major version number is 3, and the minor version number is 30.

Purpose:

Verifies that the data written on a disk has been correctly recorded.

Format:

VERIFY [ON | OFF]

Type:

Internal External

***

Remark:

VERIFY ON remains on until it is turned off through the SET VERIFY System Call or a VERIFY OFF command. When ON, DOS performs a verify operation following each disk write operation, to verify that the data just written can be read without error. Because of the extra time required to perform the verification, the system runs slower when programs write data to disk.

Typing VERIFY with no parameters displays the current state (ON or OFF) of the verify feature.

The default value of VERIFY is set to OFF.

> **Note:** VERIFY is not supported with data written to a network disk.

VERIFY
Command

Examples:

The following example sets VERIFY ON:

```
A>verify on
```

To display the current state of VERIFY, type:

```
A>verify
```

The result is:

```
VERIFY is on

A>
```

Purpose:

Displays the disk volume label of the specified drive.

Format:

VOL [*d:*]

Type:

Internal External

***

Remark:

If you do not specify a drive, the default drive is assumed.

Examples:

To display the volume label of drive A, type:

```
vol
```

The result is:

```
Volume in drive A is MYDISK

A>
```

If drive A has no label, the result is:

```
Volume in drive A has no label
```

XCOPY
Command

Purpose:
Selectively copy groups of files, which can include lower level subdirectories.

Format:

[*d:*][*path*]XCOPY [*d:*][*path*] *filename*[*.ext*]
[*d:*][*path*] [*filename*[*.ext*]][/A] [/D][/E] [/M] [/P]
[/S] [/V] [/W]

or

[*d:*][*path*]XCOPY [*d:*]*path* [*filename*[*.ext*]]
[*d:*][*path*] [*filename*[*.ext*]][/A] [/D][/E] [/M] [/P]
[/S] [/V] [/W]

or

[*d:*][*path*]XCOPY *d:*[*path*] [*filename*[*.ext*]]
[*d:*][*path*] [*filename*[*.ext*]][/A] [/D][/E] [/M] [/P]
[/S] [/V] [/W]

Type:
Internal External

***

Remark:
Specify the parameters:

[*d:*][*path*] before XCOPY specifies the drive and path that contains the command file.

[*d:*] [*path*][*filename*[*.ext*]] specifies the source drive, file, or directory that you want XCOPY to start with. The source can be a drive, a path, a file name, or any combination of the three.

[*d:*][*path*][*filename*[*.ext*]] specifies the target drive, path, and file name. This is the drive and directory */filename* that XCOPY begins copying files to.

/A Copies only those files which have the archive bit of the attribute set to one. The attribute of the source file is not changed.

/D Copies files whose date is the same or later than the date specified. Depending on the country code you selected using the SELECT or COUNTRY commands, specify the date format as:

```
/D:mm-dd-yy
```

or

```
/D:dd-mm-yy
```

or

```
/D:yy-mm-dd
```

/E Creates subdirectories on the target even if they end up being empty after all copying is over. If /E is not specified, empty subdirectories are not created.

/M Copies files whose archive bit is set. This option turns off the archive bit of the source file. It also allows XCOPY to be used in a backup procedure. When the archive bit of a file's attribute is one, it means that the file has been created or modified since the last XCOPY /M or BACKUP /M. You can use the ATTRIB command found in this section to change the archive bit.

XCOPY
Command

/P Prompts you before copying each file. You must respond to a (Y/N?) prompt. XCOPY copies on a file-by-file basis instead of a multi-file-copy.

```
d:path\filename.ext (Y/N)?
```

/S Copies files in the source directory and in all directories below the starting source directory; and causes XCOPY to travel the tree. /S does not create an empty subdirectory on the target (unless /E is also specified). If you omit the /S parameter, XCOPY works only within a directory.

/V Causes DOS to verify that the sectors written on the target diskette are recorded properly. This option has been provided so you can verify that critical data has been correctly recorded. This option causes the XCOPY command to run more slowly, due to the additional overhead of verification.

/W Instructs XCOPY to wait for you to insert diskettes, before beginning to search for source files. The following message is displayed:

```
Press any key to begin copying file(s)
```

Notes:

1. If a path is not specified, XCOPY starts from the current directory.

2. The default file name is *.*.

3. If the specified target path does not exist on the target, XCOPY creates the directories before copying files to the target.

4. You can specify the target file names just like the COPY command. This allows you to rename files on the target.

5. XCOPY does not support copying from or to the reserved device names, CON, LPT1.

6. The drive path, file name, and file name extension string cannot be longer than 63 characters. XCOPY does not support any path longer than 63 characters (starting from the root directory) at any time while searching or copying.

7. XCOPY cannot copy hidden or deny-read files from the source, and cannot copy to read-only or deny-write files on the target.

8. Do not use the XCOPY command while APPEND is in effect.

Examples:

Suppose you have the following tree structures, "C:\" as source and drive D with "D:\" as the target.

```
  ┌──────────┐                      ┌──────────┐
  │ SOURCE   │                      │ TARGET   │
  │  C:\     │                      │  D:\     │
  └────┬─────┘                      └────┬─────┘
       │                                 │
   ┌───┴────┐                       ┌────────┐
   │        │                       │  Jack  │
┌──┴───┐ ┌──┴───┐                   └────────┘
│Linda │ │ Ruth │
└──────┘ └──┬───┘
         ┌──┴────┐
      ┌──┴──┐ ┌──┴───┐
      │ Ed  │ │ Pete │
      └─────┘ └──────┘
```
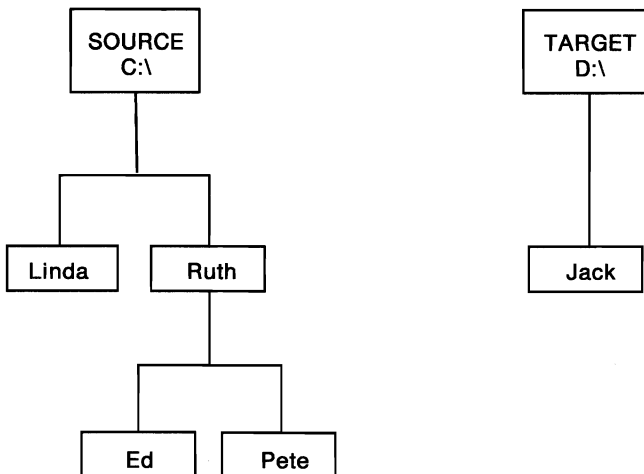
XCOPY
Command

Example 1

```
XCOPY C:\ D:\ /S
```

In this example the specified source and target
starting directory names are the same. The root
directory in the target already exists. The result is:

```
         SOURCE                          TARGET
          C:\                             D:\
           |                               |
    _____|_____              _____|_____
    |             |              |         |          |
 ┌───────┐    ┌───────┐      ┌───────┐ ┌───────┐  ┌───────┐
 │ Linda │    │ Ruth  │      │ Jack  │ │ Linda │  │ Ruth  │
 └───────┘    └───────┘      └───────┘ └───────┘  └───────┘
                 |                                     |
           _____|_____                        _____|_____
           |           |                        |           |
       ┌───────┐   ┌───────┐                ┌───────┐   ┌───────┐
       │  Ed   │   │ Pete  │                │  Ed   │   │ Pete  │
       └───────┘   └───────┘                └───────┘   └───────┘
```
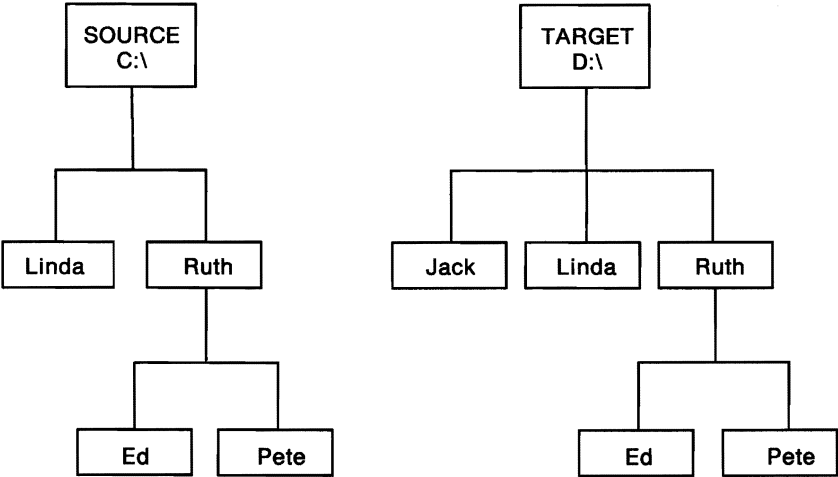
Example 2

```
XCOPY C:\Ruth D:\ /S
```

The result is:
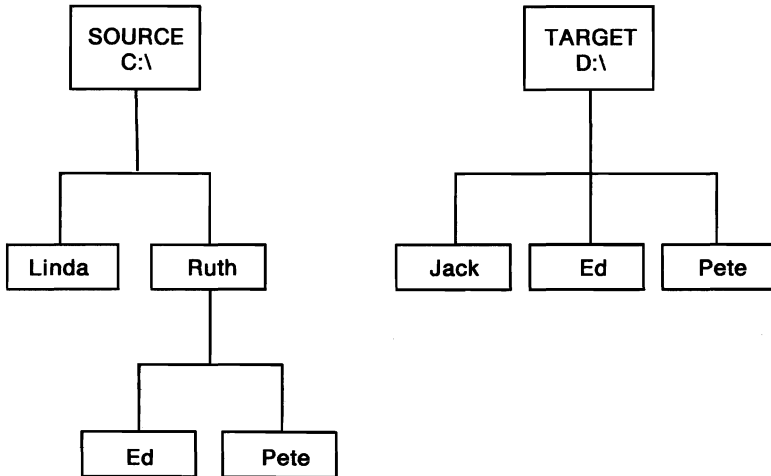
XCOPY
Command

Example 3

```
XCOPY C:\Ruth D:\EILEEN /S
```

The result, a directory called EILEEN, has been created on Drive D. Directories ED and PETE have been transferred with their contents.
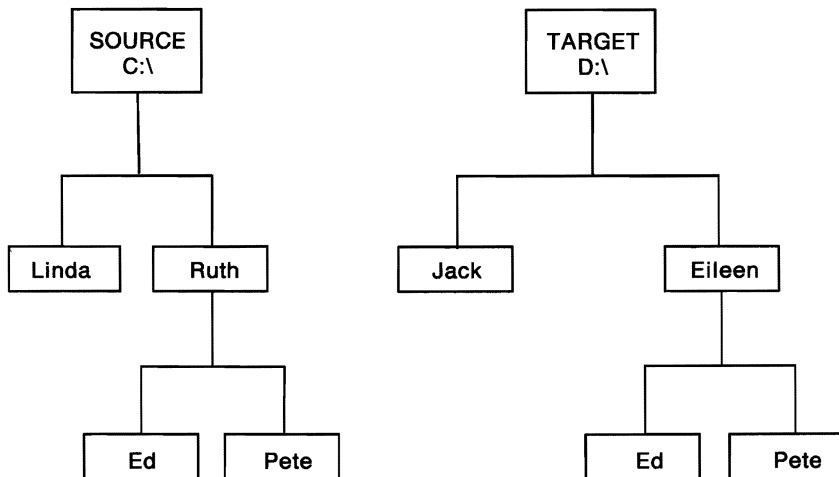
```
XCOPY C:\ C:\
or
XCOPY C:\RUTH C:\RUTH
```

XCOPY issues "Access denied" (or "File cannot be copied onto itself").

```
XCOPY C:\ C:\RUTH /S
```

Since the starting source directory is one of the members of the parents of the target starting directory, XCOPY issues a message **Cannot perform a cyclic copy.**

> **Note:** Use the /S and /M options when there is a need to use XCOPY to copy several directories or an entire disk to diskettes with insufficient space. This is an exhaustive backup. When the target diskette is full, the system shows **Insufficient disk space.** and finishes. Insert another diskette and execute the same XCOPY command as previously entered. Repeat until no **Insufficient disk space** message appears, and all the files and subdirectories have been copied to the diskettes. Remember that the archive bit of the source file has been modified (turned off). Unlike the BACKUP command, the exhaustive backup scheme lacks the ability to copy a file which is larger than the available size of the target itself.

Chapter 8. The Line Editor (EDLIN)

LINE EDITOR

Introduction

This chapter describes how to use the text Line Editor EDLIN.

Use EDLIN to create, change, and display source or text files. Source files are unassembled programs in source language format. Text files appear in a readable format.

Use EDLIN to:

- Create new source files and save them

- Update existing files and save both the updated and original files

- Delete, edit, insert, and display lines

- Search for, delete, or replace text within one or more lines.

The text of files created or edited by EDLIN is divided into lines of varying length, up to 253 characters per line.

Line numbers are generated and displayed by EDLIN during the editing process, but are not actually present in the saved file.

When you insert lines, all line numbers following the inserted text increase automatically by the number of lines inserted. When you delete lines, all line numbers following the deleted text decrease automatically by the number of lines deleted. Consequently, line numbers always go consecutively from 1 through the last line number.

> **Note:**   EDLIN erases the original backup copy (.BAK) of the file when you issue an **E** (end edit) command, or if the disk space is required during the editing session to satisfy a **W** (write lines) command.

How to Start the EDLIN Program

To start EDLIN, type:

[d:][path]EDLIN [d:][path]filename[.ext][/B]

Editing an Existing File

If the specified file exists on the designated or default drive, the file is loaded into memory until memory is 75 per cent full.
 If the entire file is loaded, the following message and prompt is
 displayed:

```
End of input file
*_
```

You can then edit the file.

> **Note:** If you have not used the /B parameter, EDLIN will stop loading the file when the first Ctrl-Z is encountered in the file's text. If you wish to edit a file that is known to contain embedded Ctrl-Z characters (end-of-file marks), you should use the /B parameter. EDLIN then processes the entire file regardless of any embedded end-of-file marks.

Notice that the prompt for EDLIN is an asterisk (*).

If the entire file cannot be loaded into memory, EDLIN loads lines until memory is 75% full, then displays the * prompt. You can then edit the portion of the file that is in memory.

To edit the remainder of the file, you must write some of the edited lines to disk. Into the freed memory you can load unedited lines from disk. Refer to the Append Lines and Write Lines commands in this chapter for the procedure.

Editing a New File

Specify a file that does not exist on the current drive. A new file is opened with the specified name and the following
message and prompt are displayed:

```
New file
*_
```

Begin creating the file by entering the desired lines of text. To begin entering text, enter an I command to insert lines.

When you have completed the editing session, you can save the file using the End Edit command. The End Edit command is discussed in this chapter in the section called "The EDLIN Commands." The new file is saved with the file name and extension you specified in the EDLIN command when you first opened the file.

> **Note:** If you edit an existing file, when you end the edit session with the End Edit command, the original file is saved with an extension of .BAK. You cannot edit a file with a file name extension of .BAK with EDLIN because the system assumes it is a backup file. If you find it necessary to edit such a file, rename the file to another extension; then start EDLIN and specify the new name.

The EDLIN Command Parameters

Parameter	Definition
line	Denotes when you must specify a line number. There are three possible entries that you can make using this parameter: 1. Enter a decimal integer from 1-65529. If you specify a number greater than the number of lines in memory, the line is added after the last line. Line numbers must be separated from each other by a comma or space. **OR** 2. Enter a pound sign (#) to specify the line after the last line in memory. Entering a # has the same effect as specifying a number greater than the number of lines in memory.

Parameter	Definition
line	OR 3. Enter a period (.) to specify the current line. The current line indicates the location of the last change to the file, but it is not necessarily the last line displayed. The current line is marked by an asterisk (*) between the line number and the first character of text in the line. For example: 10:*FIRST CHARACTER OF TEXT
n	Denotes when you must specify lines. Enter the number of lines that you want to write to disk or load from disk. You only use this parameter with the Write Lines and Append Lines commands. These commands are meaningful only if the file to be edited is too large to fit in memory.
string	Denotes when you must enter one or more characters to represent text to be found, replaced, deleted, or to replace other text. You only use this parameter with the Search Text and Replace Text commands.

The EDLIN Commands

This section describes the EDLIN commands and tells how to use them. The commands are in alphabetic order, each with its purpose, format and remarks. Examples are provided where appropriate.

Information Common to All EDLIN Commands

The following information applies to all EDLIN commands:

- With the exception of the Edit Line command, all commands are a single letter.

- With the exception of the End Edit and Quit Edit commands, commands are usually preceded and/or followed by parameters.

- Enter commands and string parameters in uppercase, or lowercase, or a combination of both.

- Separate commands and parameters with delimiters for readability; however, a delimiter is only required between two adjacent line numbers. Remember, delimiters are spaces or commas.

- Commands become effective only after you press the Enter key.

- Stop commands by pressing the Ctrl-Break keys.

- For commands producing a large amount of output, press Ctrl-Num Lock to suspend the display so that you can read it before it scrolls away. Press any other character to restart the display.

- Use the control keys and DOS editing keys, described in the *DOS User's Guide*. They are very useful for editing *within a line*, while the EDLIN commands can be used for editing operations on *entire lines*.

- The EDLIN prompt is an asterisk (*).

- It is possible to refer to line numbers relative to the current line. Use a minus (-) sign and a number to indicate a line before the current line. Use a plus (+) sign and a number to indicate a line after the current line. For example:

  ```
  -10,+10L
  ```

  This command displays 21 lines: 10 lines before the current line and 10 lines after the current line.

- Multiple commands can be entered on one command line. When you enter the command to edit a single line using [*line*], you must use a semicolon to separate the commands on the line. In the case of the Search or Replace commands the [*string*] can be terminated by Ctrl-Z (F6) instead of the Enter key. Otherwise, one command can follow another without any special delimiting characters. For example:

  ```
  15;-5,+5L
  ```

  edits line 15 and then displays lines 10 through 20 on the screen.

- Control characters can be inserted into the text, or can be used in the strings for the Search and Replace text commands. To enter a control character, press Ctrl-V, then enter the desired control character in uppercase. For example, the sequence Ctrl-V, followed by Z generates the control character Ctrl-Z.

A (Append Lines)
Command

Purpose:

Adds the specified number of lines from disk to the file being edited in memory. The lines are added at the end of the current lines in memory.

Format:

[*n*]A

Remark:

This command is only meaningful if the file being edited is too large to fit in memory. As many lines as possible are read into memory for editing when you start EDLIN. If you do not specify the number of lines, lines are appended to memory until available memory is 75% full. No action is taken if memory is already 75% full.

To edit the remainder of the file that will not fit into memory, you must write edited lines in memory to disk by using the Append Lines command. Refer to the Write Lines command for information on how to write edited lines to disk.

The message **End of input file** is displayed when the Append Lines command has read the last line of the file into memory.

C (Copy Lines) Command

Purpose:

Copies the lines in the specified range to the line number specified by the third parameter. The new data is placed ahead of the line that was specified in the third parameter. This third parameter is not optional. The operation is repeated the number of times specified in *count*.

Format:

[line],*[line]*,*line[,count]*C

Remark:

The parameter *count* defaults to 1. To repeat text, specify the number of times the operation is to be performed in *count*. If the first parameter or the second parameter is omitted, the default is the current line. This effectively copies the current line to the specified line. The file is renumbered accordingly. The first of the copied lines becomes the current line. For example:

```
1,5,8C
```

copies lines 1 through 5 to line 8. Line 8 becomes the current line.

The line numbers must not overlap or an error is reported. Also, the characters - and + are not allowed in the *count* field.

D (Delete Lines)
Command

Purpose:

Deletes a specified range of lines.

Format:

[*line*][,*line*] D

Remark:

The line following the deleted range becomes the current line, even if the deleted range includes the last line in memory. The current line and any following lines are renumbered.

If you omit the first parameter, as in:

```
,lineD
```

deletion starts with the current line and ends with the line specified by the second parameter. The beginning comma is required to indicate the omitted first parameter.

If you omit the second parameter, as in:

```
lineD    or    line,D
```

only the one specified line is deleted. If you omit both parameters, as in:

```
D
```

only the current line is deleted, and the line that follows becomes the current line.

D (Delete Lines)
Command

Examples:

Assume that you want to edit the following file. The current line is line 22.

```
1: This is a sample file used to demonstrate
2: line deletion and dynamic
3: line number generation.
   .              .
   .              .
   .              .
20: See what happens to the lines
21: and line numbers when lines are
22:*deleted.
23: See how easy this is to use.
```

If you want to delete a range of lines, from 3 − 20, enter:

```
3,20D
```

The result is:

```
1: This is a sample file used to demonstrate
2: line deletion and dynamic
3:*and line numbers when lines are
4: deleted.
5: See how easy this is to use.
```

Lines 3 − 20 are deleted from the file. Lines 21 − 23 are renumbered to 3 − 5. Line 3 becomes the current line. If you want to delete the current and the following line, enter:

```
,4D
```

The result is:

```
1: This is a sample file used to demonstrate
2: line deletion and dynamic
3:*See how easy this is to use.
```

Lines 3 and 4 are deleted from the file. Line 5 is renumbered to 3. Line 3 is still the current line, but now it has different text.

D (Delete Lines)
Command

If you want to delete a single line, such as line 2, enter:

```
2D
```

The result is:

```
1: This is a sample file used to demonstrate
2:*See how easy this is to use.
```

Line 2 is deleted. Line 3 is renumbered to 2. The new line 2 becomes the current line. If you want to delete only the current line, enter:

```
D
```

The result is:

```
1:*This is a sample file used to demonstrate
```

The current line, line 2, is deleted. The new line 1 becomes the current line.

Edit Line
Command

Purpose:

Allows you to edit a line of text. You must enter the line number of the line to be edited, or enter a period (.) to indicate the current line.

Format:

[*line*]

Remark:

If you just press Enter, you specify that the line after the current line is to be edited. The line number and its text are displayed and the line number is repeated on the line below.

You can use the control keys and the editing keys, described in the *DOS User's Guide*, to edit the line, or you can replace the entire line by typing new text. When you press the Enter key, the edited line is placed in the file and becomes the current line.

If you decide not to save the changed line, press either Esc or Ctrl-Break instead of Enter. The original line remains unchanged. Pressing the Enter key with the cursor at the beginning of the line has the same effect as pressing Esc or Ctrl-Break.

If the cursor is in any position other than the beginning or the end of a line, pressing Enter erases the rest of the line.

Examples:

Assume that you want to edit line 6. The following display would appear on the screen:

```
*6
  6: This is a sample unedited line.
  6: _
```

The first line is your request to edit line 6, followed by the two-line display response.

If you want to move the cursor to the letter **u**, press F2 and enter:

```
u
```

The result is:

```
*6

  6: This is a sample unedited line.
  6: This is a sample _
```

If you want to delete the next two characters and keep the remainder of the line, press Del twice; then press F3.

The result is:

```
*6

  6: This is a sample unedited line.
  6: This is a sample edited line._
```

Now you can take one of the following actions:

- Press Enter to save the changed line.
- Extend the changed line by typing more text. You are automatically in insert mode when the cursor is at the end of a line.

Edit Line
Command

- Press F5 to do additional editing to the changed line without changing the original line.
- Press Esc or Ctrl-Break to cancel the changes you made to the line. The original contents of the line are preserved.

E (End Edit)
Command

Purpose:

Ends EDLIN and saves the edited file.

Format:

E

Remark:

The edited file is saved by writing it to the drive and file name specified when you started EDLIN.

The original file, the one specified when EDLIN was started, is given a .BAK file name extension. A .BAK file will not be created if there is no original file; that is, if you created a new file instead of updating an old file during the editing session.

EDLIN returns to the DOS command processor, which displays the command prompt.

Be sure your disk has enough free space to save the entire file. If your disk does not have enough free space, only a portion of the file is saved. The portion in memory that is not written to disk is lost. In this case, your original file is not renamed to .BAK, and the portion of data that was written to disk will have a file name extension of $$$.

EDLIN appends a carriage return, line feed sequence to the end of the file, if it was not already present, to delimit the last line of text in the file. Also, a Ctrl-Z character is added as the last character in the saved file. This serves as an end-of-file mark.

I (Insert Lines) Command

Purpose:

Inserts lines of text immediately *before* the specified line. When you create a new file, you must enter the Insert Lines command before text can be inserted.

Format:

[*line*]I

Remark:

If you do not specify line, or if you specify line as a period (.), the insert is made immediately before the current line. If the line number you specify is greater than the highest existing line number, or if you specify # as the line number, the insertion is made after the last line in memory.

EDLIN displays the appropriate line number so that you can enter more lines, ending each line by pressing Enter. During the insert mode of operation, successive line numbers appear automatically each time Enter is pressed.

You must press Ctrl-Break to discontinue the insert mode of operation.

The line that follows the inserted lines becomes the current line, even if the inserted lines are added to the end of the lines in memory. The current line and any remaining lines are renumbered.

I (Insert Lines)
Command

Examples:

Assume that you want to edit the following file.
Line 2 is the current line.

```
1: This is a sample file used to demonstrate
2:*line deletion
3: and dynamic line number generation.
```

If you want to insert text before line 3, the entry and
immediate response look like this:

```
*3I
   3:*_
```

Now, if you want to insert two new lines of text,
enter:

```
*3 I
   3:*First new line of text
   4:*Second new line of text
   5:*
```

and press Ctrl-Break.

The original line 3 is now renumbered to line 5.

If you display the file with a List Lines command,
the file looks like this:

```
1: This is a sample file used to demonstrate
2: line deletion
3: First new line of text
4: Second new line of text
5:*and dynamic line number generation.
```

If the two lines that were inserted had been placed at
the beginning of the file, the screen would look like
this:

```
1: First new line of text
2: Second new line of text
3:*This is a sample file used to demonstrate
4: line deletion
5: and dynamic line number generation.
```

I (Insert Lines) Command

If the two lines that were inserted had been placed immediately before the current line (2 I or . I or I), the screen would look like this:

```
1: This is a sample file used to demonstrate
2: First new line of text
3: Second new line of text
4:*line deletion
5: and dynamic line number generation.
```

If the two inserted lines had been placed at the end of the file (4 I or # I), the screen would look like this:

```
1: This is a sample file used to demonstrate
2: line deletion
3: and dynamic line number generation.
4: First new line of text
5: Second new line of text
```

L (List Lines)
Command

Purpose:

Displays a specified range of lines. The current line remains unchanged.

Format:

[line][,line]L

Remark:

Default values are provided if either one or both of the parameters are omitted. If you omit the first parameter, as in:

```
,lineL
```

the display starts 11 lines before the current line and ends with the specified line. The beginning comma is required to indicate the omitted first parameter.

> **Note:** If the specified line is more than 11 lines before the current line, the display is the same as if you omitted both parameters. (An example is provided in this section showing both parameters omitted.)

If you omit the second parameter, as in:

```
lineL    or    line,L
```

a total of 23 lines are displayed, starting with the specified line.

If you omit both parameters, as in:

```
L
```

a total of 23 lines are displayed — the 11 lines before the current line, the current line, and the 11 lines after the current line. If there aren't 11 lines before

L (List Lines) Command

the current line, then extra lines are displayed after the current line to make a total of 23 lines.

Examples:

Assume that you want to edit the following file. Line 15 is the current line.

```
1: This is a sample file used to demonstrate
2: line deletion and dynamic
3: line number generation.
   .              .
   .              .
   .              .
15:*This is the current line (note the asterisk)
   .              .
   .              .
   .              .
25: See what happens to the lines
26: and line numbers when lines are
27: deleted.
```

If you want to display a range of lines, from 3 – 25, enter:

```
3,25L
```

The screen looks like this:

```
3: line number generation.
   .              .
   .              .
   .              .
15:*This is the current line (note the asterisk)
   .              .
   .              .
   .              .
25: See what happens to the lines
```

If you want to display the first three lines, enter:

```
1,3L
```

The screen looks like this:

```
1: This is a sample file used to demonstrate
2: line deletion and dynamic
3: line number generation.
```

If you want to display 23 lines of the file, starting with line 3, enter:

```
3L
```

The screen looks like this:

```
3: line number generation.
 .              .
 .              .
 .              .
15:*This is the current line (note the asterisk)
 .              .
 .              .
 .              .
25: See what happens to the lines
```

If you want to display 23 lines centered around the current line, enter:

```
L
```

The screen looks like this:

```
4: Fourth line of text
5: Fifth line of text
 .              .
 .              .
 .              .
15:*This is the current line (note the asterisk)
 .              .
 .              .
 .              .
25: See what happens to the lines
26: and line numbers when lines are
```

M (Move Lines)
Command

Purpose:

Moves the range of lines specified by the first two *line* parameters ahead of the line specified in the third *line* parameter. The third parameter is not optional.

Format:

[*line*],[*line*],*line*M

Remark:

Use this command to move a block of data from one location in the file to another. If the first or second line parameter is omitted, it will default to the current line. After the move, the first of the moved lines becomes the current line. The lines are renumbered according to the direction of the move. For example:

,+25,100M

moves the data from the current line plus 25 lines to line 100. If the line parameters overlap an entry error is reported.

P (Page)
Command

Purpose:

Lists the specified block of lines.

Format:

*[line][, line]*P

Remark:

If the first *line* parameter is omitted, it defaults to the current line plus one. If the second *line* parameter is omitted, 23 lines are listed. The new current line becomes the last line displayed by the Page command and is marked with an asterisk. This command pages through a file displaying 23 lines at a time. It differs from the List Lines command in that it changes the current line.

Q (Quit Edit)
Command

Purpose:

Quits the editing session without saving any changes you may have entered.

Format:

Q

Remark:

EDLIN prompts you to make
sure you really don't want to save the changes.

Enter **Y** if you want to quit the editing session. No editing changes are saved and no .BAK file is created. Refer to the End Edit command for information about the .BAK file.

Enter **N**, or any other character, if you want to continue the editing session.

Examples:

When you type the letter Q,
the following is displayed:

```
Q
Abort edit (Y/N)?_
```

R (Replace Text)
Command

Purpose:

Replaces all occurrences of the first string in the specified range of lines with the second string.

Notes:

1. If you omit the second string, Replace Text deletes all occurrences of the first string within the specified range of lines. If you omit both strings, EDLIN re-uses the search string entered with the most recent (previous) **S** or **R** command, and the Replace Text string entered with the last **R** command.

2. This command uses the F6 key as normally setup by DOS. If you have changed the meaning of the F6 key through "Extended Keyboard Control" (see Chapter 3 of the *DOS Technical Reference* manual), you should press Ctrl-Z where F6 is referred to below.

EDLIN displays the changed lines each time they are changed. The last line changed becomes the current line.

Format:

[*line*][,*line*] [?]R[*string*][< F6 > *string*]

Remark:

You can specify the optional parameter **?** to request a prompt (**O.K.?**) after each display of a modified line. Press **Y** or the Enter key if you want to keep the modification.

Enter any other character if you don't want the modification. In either case, the search continues for

R (Replace Text)
Command

further occurrences of the first string within the range of lines, including multiple occurrences within the same line.

Defaults occur if either one or both of the *line* parameters are missing.

If you omit the first *line*, the search begins with the line after the current line. If you omit the second *line*, the search ends with the last line in memory. If you omit both *line* parameters, the system searches from the line following the current line to the last line in memory.

> **Note:** The first string begins with the character in the position immediately following the R, and continues until you press F6 or Ctrl-Z (or the Enter key if the second string is omitted).
>
> The second string begins immediately after you press F6 or Ctrl-Z and continues until you press Enter.

Examples:

Assume that you want to edit the following file. Line 7 is the current line.

```
1: This is a sample file
2: used to demonstrate
3: the Replace and Search Text commands.
4: This includes the
5: optional parameter ?
6: and required string
7:*parameter.
```

R (Replace Text) Command

To replace all occurrences of **and** with **or** in the lines in memory, enter:

```
1,7 Rand
```

Then press F6, type **or**, and press Enter.

The result is:

```
3: the Replace or Search Text commands.
3: the Replace or Search Text commors.
6: or required string
```

Line 6 becomes the current line in the file because line 6 was the last line changed. Notice that lines 1, 2, 4, 5, and 7 are not displayed because they were not changed.

Greater selectivity can be achieved by requesting a prompt
(by using the ? parameter) after each display of a modified line. If you request a prompt, the screen looks like this:

```
*1,7 ? Rand (Press F6, type or, and press Enter)
     3: the Replace or Search Text commands
O.K.? Y
     3: the Replace or Search Text commors
O.K.? N
     6: or required string
O.K.? Y
*
```

Lines 3 and 6 are displayed like this:

```
3: the Replace or Search Text commands.
6: or required string
```

S (Search Text) Command

Purpose:

Searches a specified range of lines in order to locate a specified string.

Format:

[line][,line] [?]S[*string*]

Remark:

The first line to contain the specified string is displayed and the search ends (unless you use the ? parameter). The first line found that contains the specified string becomes the current line.

> **Note:** The Search command always searches for the exact same character in text. That is, it searches for UPPERCASE if you enter UPPERCASE, and lowercase if you enter lowercase.

You should specify the optional parameter ? if you would like a prompt (O. K.?) after each display of a line containing the specified string.

If you do not enter a string, the S command uses the last search string entered on a Replace or Search command. If the specified string is not found, the search ends and the message **Not found** is displayed. The current line remains unchanged. If you enter **Y** or press the Enter key, the line that matches the specified string becomes the current line and the search ends. Enter any other character to continue the search until another string is found, or until all lines within the range are searched. Once all the lines within the range are searched, the **Not found** message is displayed.

S (Search Text)
Command

The system provides default values if you omit the first, second, or both line parameters. If you omit the first line parameter, the system defaults to the line following the current line. If you omit the second line parameter, the system defaults to the last line in memory. If you omit both line parameters, the system searches from the line following the current line to the last line in memory.

Notes:

1. The string begins with the character in the position immediately following the **S** and continues until you end the string by pressing the Enter key.

2. If you wish to place more than one command on a line containing a Search Text command, the Search Text command should end in a Ctrl-Z (F6), and the next command should begin in the following character position.

Examples:

Assume that you want to edit the following file. Line 7 is the current line.

```
1: This is a sample file
2: used to demonstrate
3: the Search Text command.
4: This includes the
5: optional parameter ?
6: and required string
7:*parameter.
```

If you want to search for the first occurrence of **and** in the file, enter:

S (Search Text)
Command

```
1,7 Sand
    or
1, Sand
    or
1Sand
```

The result is:

```
      3: the Search Text command.
*
```

The **and** is part of the word **command**. Notice that line 3 becomes the current line in the file.

Perhaps this is not the **and** you were looking for. To continue the search, simply enter the letter **S** and press Enter. The search continues with the line following the current line (the line just found).

The screen looks like this:

```
*1,7 Sand
      3: the Search Text command.
*S
      6: and required string
*
```

Line 6 now becomes the current line in the file.

You can also search for strings by requesting a prompt
 (by means of the ? parameter) after each display of a matching
 line. In this case, the screen looks like this:

```
*1,7 ? Sand
      3: the Search Text command.
O.K.? N
      6: and required string
O.K.? Y
*
```

T (Transfer Lines)
Command

Purpose:

Transfers (merges) the contents of a specified file into the file currently being edited.

Format:

[*line*]T[*d:*]*filename*

Remark:

The *filename* contents are inserted ahead of the *line* in the file being edited. If *line* is omitted, the current line is used.

> **Note:** The file being merged is read from the current directory of the specified or default drive. If a path was specified when you issued the EDLIN command, that path becomes the current directory for that drive for the duration of the EDLIN session, and any Transfer Lines commands for that drive must be satisfied from the same directory.

W (Write Lines) Command

Purpose:

Writes a specified number of lines to disk from the lines being edited in memory. Lines are written beginning with line number 1.

Format:

[*n*]W

Remark:

This command is only meaningful if the file you are editing is too large to fit in memory. When you start EDLIN, it reads lines into memory until memory is 75% full.

To edit the remainder of the file not in memory, you must write edited lines in memory to disk. Then you can load additional unedited lines from disk into memory by using the Append Lines command.

> **Note:** If you do not specify the number of lines, lines are written until 25% of available memory is used. No action is taken if available memory is already less than 25% used. All lines are renumbered so that the first remaining line becomes number 1.

Chapter 9. Code Page Switching

CODE PAGE SWITCHING

Introduction

Code page switching is a new feature of DOS 3.30 that changes the characters displayed on a screen or printed on a device. This chapter describes how code page switching works, why it is used, and how it is installed.

To use this feature, you must have one of the following display types:

- Enhanced Graphics Adapter (EGA)
- IBM PC Convertible LCD (LCD)
- IBM Personal System/2 Displays (EGA)

and one of the following printer types:

- IBM Proprinter Model 4201
- IBM Quietwriter III Printer Model 5202

If you reside in the United States or any other country listed in the table on page 9-7, you do not have to use code page switching. If you reside in French-speaking Canada, Denmark, Norway, or Portugal, you must use code page switching.

> **Note:** You can use code page switching without fully understanding everything about it. You may go directly to the section entitled "How to Install Code Page Switching" and follow the step-by-step procedure.

Code Page Definition

Computers store data as numeric values. When you
need to display or print information, the computer
translates the numeric values into letters, numbers,
symbols, and characters you can recognize. The
computer uses a table called a code page to
accomplish this.

A code page contains the definition of one or more
character sets. For example,

```
abcdefghijklmnopqrstuvwxyz
0123456789
~!@#$%^&*( )_+,./;'[]?{}
```

may be defined as a code page.

A code page may contain up to 16 rows and 16
columns of characters (see Appendix C). The points
at which a row and column intersect contain a
character. Each DOS code page has 256 characters.
Since different languages use different code pages, we
need ways to display and switch between the code
pages.

For example, in code page 437 (see Appendix C), the
point where the column labeled F intersects with the
row labeled 2 contains the ≥ character. However, in
code page 850 (see Appendix C), this block contains
the = character.

What is Code Page Switching?

DOS 3.30 provides several pairs of code pages which are similar, but they do not contain all of the same characters. For example, the code pages in previous versions of DOS contain the single bar and double bar graphic characters and scientific symbols. In the new multilingual code page (850), most of the scientific symbols and many of the the box graphic characters have been replaced with international characters. Having all of the international characters contained in one code page allows DOS 3.30 to support eleven languages, rather than the five supported by previous versions of DOS.

The new multilingual code page (850) contains all characters for most European and North and South American countries. This code page provides additional characters that may be useful when creating new information.

DOS 3.30 supports the existing code page 437, as well as the following code pages and their corresponding languages:

Code Page	Language
850	Multilingual
860	Portuguese
863	Canadian French
865	Norwegian and Danish

CODE PAGE SWITCHING

Why Use Code Page Switching?

If information is entered in a particular code page, it must be viewed in that code page, or some characters may be displayed differently than expected. Since multiple code pages exist, you may need to view existing files created with the existing code page and to view files created with the new 850 code page.

New users should install the new country code pages, because the code pages supplied with DOS 3.30 provide additional national language support for more countries than the previous DOS versions.

If you are now using a previous version of DOS, and code page 437 is your existing code page (see the table on the following page), you should install the new code page so that you can view documents created with the existing code page and access code page characters supplied with DOS 3.30.

If code page 437 is *not* your existing code page (see the table on the following page), you must use the new code page to support your existing code page.

Warning: If you encounter problems while using the new code pages with some PC applications, you should terminate the application program and then select the existing code page for your country.

If you want to install code page switching, see the next section in this chapter entitled "How to Install Code Page Switching."

How to Install Code Page Switching

DOS 3.30 allows for switching among several pairs of code pages. In the step-by-step procedure in this chapter, substitute your system's values from the following table showing the existing country code pages and the new code pages.

Country	Keyboard Code	Existing Code Page	New Code Page
Australia	US	437	850
Belgium	BE	437	850
Canada (Eng.)	US	437	850
Canada (Fr.)	CF	863	850
Denmark	DK	865	850
Finland	SU	437	850
France	FR	437	850
Germany	GR	437	850
Italy	IT	437	850
Latin America	LA	437	850
Netherlands	NL	437	850
Norway	NO	865	850
Portugal	PO	860	850
Spain	SP	437	850
Sweden	SV	437	850
Switzerland (Fr.)	SF	437	850
Switzerland (Ger.)	SG	437	850
United Kingdom	UK	437	850
United States	US	437	850

CODE PAGE SWITCHING

In order to use code page switching, DOS uses information from font files for the code pages. Each font file contains device information describing the various code pages. In the step-by-step procedure in this chapter, substitute your system's values from the following table.

Device supported	Font files
EGA type displays	EGA.CPI*
IBM Proprinter Model 4201	4201.CPI
IBM Quietwriter III Printer Model 5202	5202.CPI
IBM PC Convertible LCD	LCD.CPI

* Code Page Information

To install code page switching, you must add commands to two files, CONFIG.SYS and AUTOEXEC.BAT. The CONFIG.SYS file contains commands that tell DOS what kinds of devices are attached to your computer. The AUTOEXEC.BAT file contains commands that DOS will perform each time you start it. By modifying these two files, you can tell DOS which devices support code page switching and which code pages should be loaded. By using the MODE and CHCP commands, you can overlay the current code page with another one.

Use the MODE command to change the code pages for displays and printers and the KEYB command to change the code page for the keyboard. The MODE command places new code pages into random access memory (RAM) for the devices and switches between multiple code pages, if that capability in the device is supported.

The command you should add to the CONFIG.SYS file is:

- DEVICE =, to describe the display and printer devices that will use code page switching.

  Substitute your system's values from the table in Chapter 4 under "DEVICE = commands."

The commands you should add to the AUTOEXEC.BAT file are:

- NLSFUNC, to load national language support code.

- MODE, to prepare and select code pages specified for devices defined in the CONFIG.SYS file.

- KEYB, to load keyboard support for the language you specify.

The following examples show how to install code page switching. You may follow these examples and substitute information for your system.

Notes:

1. It is recommended that both files and subdirectories be named using only the characters A-Z and 0-9. This prevents file access problems when switching between code pages and their associated name character capitalization rules.

2. The following examples assume that a CONFIG.SYS file and an AUTOEXEC.BAT file already exist on your system. These two files are created for you when you install DOS 3.30 for the first time.

Adding DEVICE= statements to the CONFIG.SYS file

1. To add statements to the CONFIG.SYS file, type:

    ```
    copy config.sys+con
    ```

2. Press Enter.

    The following is displayed:

    ```
    config.sys
    con
    ```

3. To prepare the code page driver for your display, type the following, substituting your system's values for *d*:\, *type*, and *n*.

    ```
    device=d:\display.sys con:=(type,437,n)
    ```

    where:

d:\	specifies the drive and path where the DISPLAY.SYS file is located.
type	specifies the display adapter type. Use LCD for the IBM PC Convertible and EGA for all others.
n	is the number of code pages to be added. If 437 is your existing code page, specify 1. If 437 is not your existing code page, specify 2.

4. Press Enter.

5. To prepare the code page driver for your printer, type the following, substituting your system's values for *d*:\, *type*, and *n*.

device=*d*:\printer.sys lpt1:=(*type*,437,*n*)

where:

d:\	specifies the drive and path where the PRINTER.SYS file is located.
type	specifies the type of printer you have. Use 4201 for the IBM Proprinter Model 4201 or 5202 for the IBM Quietwriter III Printer Model 5202.
n	is the number of code pages to be added. If 437 is your existing code page, specify 1. If 437 is not your existing code page, specify 2.

6. Press Enter.

Note: Remember each printer requiring code page switching *must* have an LPT*n*: parameter, where *n* is the port position for the printer. You may specify as many as three printers in the same DEVICE = statement.

7. When you have typed in all DEVICE = statements, press the F6 key and the Enter key. The CONFIG.SYS setup procedure is complete.

CODE PAGE SWITCHING

Adding commands to the AUTOEXEC.BAT file

1. To add commands to the AUTOEXEC.BAT file, type:

   ```
   copy autoexec.bat+con
   ```

2. Press Enter.

   The following is displayed:

   ```
   autoexec.bat
   con
   ```

3. Type:

   ```
   nlsfunc
   ```

4. Press Enter.

5. To prepare the devices defined in the CONFIG.SYS file, type the following, substituting your system's values for *cplist*, *d:*\ and *cpfile*.

   ```
   mode con: cp prepare=((cplist) d:\cpfile)
   ```

   where:

cplist	is 850, if your existing code page is 437. If code page 437 is not your existing code page, *cplist* is 850 plus your existing code page, for example, 850,865.
d:\	specifies the drive and path where the display code page font file is located.
cpfile	specifies the name of the code page font file. Use LCD.CPI for the IBM PC Convertible LCD and EGA.CPI for all others.

6. Press Enter.

7. To prepare the printer for code page switching, type the following, substituting your system's values for *cplist*, *d:* and *cpfile*.

   ```
   mode lpt1: cp prepare=((cplist) d:\cpfile)
   ```

   where:

cplist	is 850, if your existing code page is 437. If code page 437 is not your existing code page, *cplist* is 850 plus your existing code page, for example, 850,865.
d:	Specifies the drive and path where the printer code page font file is located.
cpfile	specifies the name of the code page font file. Use 4201.CPI for the IBM Proprinter Model 4201 or 5202.CPI for the IBM Quietwriter III Printer Model 5202.

8. Press Enter.

9. To select (activate) the code page that you prepared for your display and printer, type:

   ```
   chcp nnn
   ```

   where *nnn* is your existing code page. If you are new to DOS, use 850.

10. Press Enter.

11. To prepare the keyboard for code page switching, type:

    ```
    keyb xx,,d:\keyboard.sys
    ```

    where:

    xx   specifies your keyboard code.
                        (See the table on page 9-7.)

    d:\   specifies the drive and the path
                        where the KEYBOARD.SYS file
                        is located.

12. Press Enter.

13. After you have added all the commands to the
    AUTOEXEC.BAT file, press the F6 key and the
    Enter key. The AUTOEXEC.BAT setup
    procedure is complete.

14. Restart your system to install the code page
    drivers.

Appendix A. Messages

MESSAGES

A-1

Introduction

This appendix contains *device errors* (the messages that DOS uses to indicate errors while reading or writing to devices on your system), and *other messages* (the remainder of the DOS messages) in alphabetic order. Messages are listed in **bold** type and the explanation and action follow the message.

The first word of the description of each message is the name of the program or command that generated the message.

In some cases, the message is generated by several different programs or commands. In that case, the first word is **command**. Where the message is generated by an internal DOS file, the first word is **DOS**.

Responses

When any of the device error messages are displayed, the system waits for you to respond. Depending on the type of error, not all of these choices appear. If you know what caused the problem, take corrective action before choosing a response. The system waits until you make *one* of these responses.

To recover from an error condition, the responses should be made in the following order:

R   **Retry** the operation because the error may not occur again. The system tries the read or write operation again. We strongly recommend that you use **Retry** first.

A   **Abort** the program. The system ends the program that requested the read or write operation.

F   **Fail** the current DOS system call and continue program execution. Be cautious when choosing this response if there is risk of damage to data.

I   **Ignore** the error condition and continue the program. (Be careful when choosing this response because data may be lost.) The system is unable to determine whether the condition is dangerous.

In previous versions of DOS, the system converted the "Ignore" option to "Fail" for certain system calls. For these system calls, the behavior for "Fail" in this version is the same as "Ignore" in previous versions.

Device Error Messages

When an error is detected during reading or writing to any of the devices (disk drives, printer, etc.) on your system, DOS displays a message in the following format:

< *type* > error reading < *device* >
Abort, Retry, Ignore, Fail?
          or
< *type* > error writing < *device* >
Abort, Retry, Ignore, Fail?

In these messages, < *device* > is the name of the device in error, such as **PRN**, or **B:**, and < *type* > is one of the types listed on the following pages. The options (**Abort, Retry, Ignore, Fail**) are pertinent to a specific error message displayed. A diskette error may display the following message: **Abort, Retry, Fail**. The **Ignore** option will not be displayed.

Bad call format

Explanation: A device driver was passed an incorrect length request header.

Action: Refer to "Responses" at the beginning of this group of device messages.

• Use DEBUG.

- Review your programming specifications. Patch and reassemble.

- If you are using a purchased program, contact the dealer you purchased the device driver from.

Bad command

Explanation: A device driver has issued an invalid command to < *device* > .

Action: Refer to "Responses" at the beginning of this group of device messages.

- Review your device interface specification and DOS driver implementation to make sure everything you are trying to do is supported.

- Check your program to see if you have a coding problem that needs debugging.

Bad unit

Explanation: A device driver has been passed an invalid sub − unit number.

Action: Refer to "Responses" at the beginning of this group of device messages. If you are using a purchased program, contact the dealer where you purchased the device driver.

Data

Explanation: DOS was unable to read or write the data correctly. This message usually means a disk has developed a defective spot.

Action: Refer to "Responses" at the beginning of this group of device messages.

Drive not ready error

Explanation: An error occurred while attempting to read

or write to the indicated drive. Common causes of this error are:

- The drive door is not closed.

- The diskette is not properly formatted.

Action: Assure the diskette is formatted and the drive door is closed and try again.

FCB unavailable

Explanation: With file sharing loaded, you tried to concurrently open more file control blocks than were specified by the FCBS configuration command.

Action: Choose **Abort** as your response. Then, increase the value of the FCBS configuration command.

General failure

Explanation: An error not described elsewhere in this list has occurred, common causes of this error are:

- Diskette type and drive type do not match (for example, a 1.2MB high capacity diskette in a 320/360KB drive).

- The diskette is not completely inserted in the drive and/or the drive door is open.

- The diskette is not properly formatted.

Action: Refer to "Responses" at the beginning of this group of device messages. Choose **Retry** first. Then choose **Abort** if this problem requires further investigation by a programmer.

If you are using a purchased program, contact the dealer you purchased it from.

No paper

> **Explanation:** The indicated printer is either out of paper or not turned on.

> **Action:** Turn the printer ON, press the ONLINE switch, or add paper and retry. See the MODE command description of continuous retry in Chapter 7.

> Refer to "Responses" at the beginning of this group of device messages.

Non-DOS disk

> **Explanation:** The file allocation table contains invalid information. The disk needs to be reformatted.

> **Action:** Refer to "Responses" at the beginning of this group of device messages.

> Try running CHKDSK to see if any corrective action is possible. Reformatting will correct the disk, but the files are lost forever.

Not ready

> **Explanation:** The named device is not ready to accept or transmit data.

> **Action:** For disk drives assure that the diskette is formatted and the drive door is closed and try again. For printers assure that the printer is on, online, not busy and has sufficient paper, and try again. See the MODE command description of continuous retry in Chapter 7.

> Refer to "Responses" at the beginning of this group of device messages.

Read fault

> **Explanation:** DOS was unable to read the data from the device.

MESSAGES

Action: Refer to "Responses" at the beginning of this group of device messages.

- Make sure the diskette is properly inserted in the drive.

- If you get the same message, choose **Abort** and rerun the command with a different disk.

Sector not found

Explanation: The sector containing the data could not be located on the disk.

Action: Refer to "Responses" at the beginning of this group of device messages.

If you get the same message, choose **Abort** and rerun the command with a different disk.

Seek

Explanation: The fixed disk or diskette drive was unable to locate the proper track on the disk.

Action:

- Make sure the diskette is properly inserted in the drive.

- Try a different drive.

- Run CHKDSK.

Refer to "Responses" at the beginning of this group of device messages.

Sharing violation

Explanation: SHARE. You tried to access a file using a sharing mode not allowed at this time. Normally this occurs when someone else is accessing the file in

compatibility mode for writing, or in a sharing mode that doesn't allow you to access the file at the same time.

Action: Choose **Retry** as your first response. If that fails, choose **Abort**.

Write fault

Explanation: DOS was unable to write the data to the device.

Action:

- Make sure the diskette is properly inserted in the drive.

- If the diskette is not the problem, choose **Retry**.

- If you get the same message, choose **Abort** and rerun the command with a different disk.

Refer to "Responses" at the beginning of this group of device messages.

Write protect

Explanation: An attempt was made to write on a write-protected diskette.

Action: Investigate carefully before you decide to write on a write protected diskette.

Important: If you attempt to use a double-sided diskette in a single-sided drive, or if you attempt to use a 9-sector-per-track diskette on a version of DOS previous to version 2.00, one of the preceding messages appears. If any of the preceding messages appear for a diskette drive, DO NOT change diskettes before responding with **Abort, Retry, Ignore**, or **Fail**.

MESSAGES

Other Messages

The following messages are in alphabetic order.

A

Abort edit (Y/N)?

> **Explanation**: EDLIN. This message is displayed if you specify the Q command to quit the edit.

> **Action**: Type a **Y** to end the edit. Type a **N** to continue editing the file.

About to generate .EXE file
Change diskette in drive A: and press < ENTER >

> **Explanation**: LINK. This message appears before the .EXE has been written if the /P switch is given.

> **Action**: Insert the diskette that the .EXE file is to be written to into the specified drive (A: for example).

Access denied

> **Explanation**: COMMANDS. Executing the requested command violates the access mode of the file, subdirectory, or device involved. For example, an attempt was made to write to a file marked read-only, or read a file that is write-only. Or an attempt was made to open a subdirectory as a file.

> **Action**: Use a different file name.

Active code page: *xxx*

> **Explanation**: CHCP. This is the code page that DOS is currently using. It may not be the same code page currently being used by some attached devices.

> **Action**: None.

Active code page for device *ddd* is *nnn*

Explanation: MODE.
Where:
ddd = device name
nnn = numeric id of the active code page

In response to a MODE command code page status request, the indicated device has been activated to use the indicated code page.

Action: None required. If the desired code page is not the active one, the MODE SELECT function can be used to change the specification, provided the new code page has been defined for the device by an appropriate MODE PREPARE command.

Active code page not available from CON device

Explanation: KEYB. The KEYB status function was requested, but the loaded CON code page could not be determined. This is an information message only. Either the code page switching CON driver has not been installed, or there is no currently loaded CON code page.

Action: None.

Add d:\path\filename?

Explanation: REPLACE. The /P parameter was specified and REPLACE is asking if you want the file to be added to the target.

Action: Type "y" or "n" and press enter.

Adding d:\path\filename

Explanation: REPLACE. Informative message indicating that the file is being added to the target directory.

Action: None.

All files canceled by operator

Explanation: PRINT/T. Informational message. You use the PRINT command with the /T parameter to cancel the printing of all queued files.

Action: This message appears on the printer.

All logical drives deleted in the Extended DOS partition

Explanation: FDISK. There are no more logical drives defined in the extended DOS partition.

Action: Delete the extended DOS partition if it is no longer needed on the fixed disk.

All specified file(s) are contiguous

Explanation: CHKDSK. Informational message. The file or files you named are all written sequentially on the disk.

Action: No action required.

Allocation error for file, size adjusted

Explanation: CHKDSK or CHKDSK /F. A file name precedes this message. An invalid cluster number was found in the file allocation table. **Action**:

• If you specified the /F parameter, the file is truncated at the end of the last valid cluster.

• If you did not enter the /F parameter, the message is for your information and no action is needed. Enter:

```
CHKDSK/F
```

to correct the file size.

Amount read less than size in header

Explanation: EXE2BIN. The program portion of the file was smaller than indicated in the file's header.

Action: Recompile or reassemble the program, and then relink it.

APPEND already installed

Explanation: APPEND. The external version of APPEND was invoked more than once. Once APPEND is resident, only the internal version can be used.

Action: Load APPEND without a leading drive or directory specification so that the internal version will be executed.

APPEND / ASSIGN conflict

Explanation: APPEND. You have loaded the ASSIGN command before you loaded APPEND. You must load APPEND first if you wish to load both APPEND and ASSIGN.

Action: Change your startup procedure to load APPEND first.

APPEND / TopView conflict

Explanation: APPEND. TopView and APPEND were not loaded in the correct order.

Action: Exit TopView, reload APPEND, and re-enter TopView.

Array element size mismatch

Explanation: LINK. A far communal array has been declared with two or more different array element sizes (for example, declared once as an array of characters and once as an array of reals).

Action: Match definitions and recreate the object module.

Attempt to access data outside of segment bounds

Explanation: LINK. An object file is invalid.

Action:

- Review the .ASM file or assembled listing for segmentation violations.

- Look for a bad reference or invalid instruction.

Attempt to put segment *xxxxxx* in more than one group in file *xxxxxx*

Explanation: LINK. A segment was declared to be part of two different groups.

Action: Correct the source and recreate the object files.

Attempted write protect violation

Explanation: FORMAT. The diskette being formatted is write protected and cannot be written on.

Action: In response to the displayed prompt, insert a new diskette and try again.

B

*** Backing up files to drive *x* ***
Number: *x*

Explanation: BACKUP. Informational message telling you the sequence of file being backed up.

Action: No action required.

Backup file sequence error

Explanation: RESTORE. A file to be restored was

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backed up on more than one diskette. You did not insert the diskette with the first part of the file.

Action: Rerun RESTORE and start with the correct diskette.

Bad command or file name

Explanation: DOS. The command you just entered is not a valid DOS command.

Action: Check the spelling of the command and re-enter it.

If the command name is spelled correctly, check to see that the default drive contains the external command or batch file you are trying to execute.

Bad internal reloc table

Explanation: LINK. Internal linker error.

Action: Record the scenario that produced this message, and contact your IBM dealer.

Bad or missing Command Interpreter

Explanation: DOS. The disk that DOS is being started from does not contain a copy of COMMAND.COM, or an error occurred while the disk was being loaded.

This message also appears if COMMAND.COM has been removed from the directory it was in originally when DOS was started; or if the **COMSPEC=** parameter in the environment points to a directory not containing COMMAND.COM, and DOS is trying to reload the command processor. The value used to set the environment did not fall within the specified range of 160 to 32768, or the SHELL command in the CONFIG.SYS file contains a syntax error.

Action: Do a system reset. Select the correct value to set the environment size, check the syntax of the SHELL

command, or do a system reset. If system reset fails to solve the problem, start DOS with your backup DOS diskette. Then copy COMMAND.COM from the backup diskette to the root directory of the disk that failed.

Bad or missing < file name >

Explanation: DOS. This message appears only at startup and indicates one of the following:

1. The name of a driver in a **DEVICE =** < file name > parameter in the CONFIG.SYS file was not found.

2. A break address was out of bounds for the machine size.

3. An error occurred while the driver was being loaded. That driver is not installed by DOS.

Action:

1. For an incorrect device driver name, use the correct spelling for the device driver name, or use the diskette with the *named* device driver.

2. For items b and c, correct the coding in the device driver.

3. If you still cannot correct the problem, see your authorized IBM dealer.

Bad or missing Keyboard Definition File

Explanation: KEYB. The KEYBOARD.SYS file could not be found, or it contained invalid data.

Action: Ensure that the specified KEYBOARD.SYS file exists. If the file exists, then it has most likely been corrupted. In this case, you should obtain a new KEYBOARD.SYS file from the original DOS Start-Up Diskette or the original DOS Start-Up/Operating Diskette.

Bad Partition Table

> **Explanation**: FORMAT. The partition table of the fixed disk does not have a DOS partition, or the partition table is invalid.
>
> **Action**: Load FDISK, set up a new DOS partition on the fixed disk, and retry FORMAT.

Bad Unit

> **Explanation**: COMMANDS. A disk I/O device driver encountered a critical error in or within an unrecognized or invalid device.
>
> **Action**: Record the environment and sequence of events and notify the author of the device driver or your authorized IBM dealer.

Batch file missing

> **Explanation**: DOS. DOS could not locate the batch file it was processing. The file may have been erased or renamed by one of the steps within it. The current drive may have been changed within the batch file, the batch processor can no longer find the .BAT file using your PATH. Batch processing stops and the DOS prompt appears.
>
> **Action**:
>
> 1. If the file name was changed correct the command that changed the name.
>
> 2. If the file was erased, use your backup copy. If you used EDLIN to create the file or make changes, rename the .BAK file to .BAT. Correct the command that deleted the file.
>
> 3. Include the drive letters in the PATH.

BF

Explanation: DEBUG. Bad flag. An invalid flag code setting was specified.

Action: Try the Register (R F) command again with the correct code.

BP

Explanation: DEBUG. Breakpoints. More than ten breakpoints were specified for the GO command.

Action: Re-enter the GO (G) command again with ten or fewer breakpoints.

BR

Explanation: DEBUG. Bad register. An invalid register name was specified.

Action: Re-enter the Register (R) command using a correct register name.

BREAK is on|off

Explanation: BREAK. This message indicates the status of BREAK, either on or off.

Action: Enter the command you want. For example if the screen shows **Break is off** and **Break is on** is desired, enter the command:

```
BREAK ON
```

Buffer size adjusted

Explanation: VDISK. VDISK found it necessary to adjust the buffer size value in the Device=VDISK.SYS in the CONFIG.SYS command.

Action: No action required.

Buffer size:
Sector size:
Directory entries:
Transfer size:

> **Explanation**: VDISK. VDISK has successfully installed a
> virtual disk indicating the virtual disk size, the sector size,
> the number of directory entries in use, and the maximum
> transfer size for the virtual disk.

> **Action**: No action required.

C

Cannot CHDIR to root

> **Explanation**: CHKDSK. CHKDSK, during its scan of
> the disk, attempted to CHDIR to the root but failed.
> This failed attempt is due to a damaged disk.

> **Action**: No action required.

Cannot CHKDSK a network drive

> **Explanation**: You cannot CHKDSK a drive that is either
> a network disk or a disk that is on your computer, but is
> currently being shared on the network.

> **Action**: If the disk is being shared, you can PAUSE the
> server, do CHKDSK, then CONTINUE the server.

Cannot CHKDSK a SUBSTed or ASSIGNed drive

> **Explanation**: SUBST. SUBST hides disk/device
> information necessary to CHKDSK.

> **Action**: Remove the substitution and try again.

Cannot create extended DOS partition
without primary DOS partition on disk 1

> **Explanation**: FDISK. On disk 1 you cannot have an

extended DOS partition unless a primary DOS partition also exists.

Action: Use FDISK to create a primary DOS partition on disk 1. You should leave enough room on the disk to allow space for the extended DOS partition.

Cannot create a zero cylinder partition

Explanation: A partition must be a minimum of 1 cylinder.

Action: Specify a size for the partition that is at least 1 cylinder.

Cannot delete extended DOS partition while logical drives exist

Explanation: FDISK. You cannot delete the extended DOS partition while there are logical DOS drives defined in that partition.

Action: Use FDISK to delete all of the logical DOS drives in the extended DOS partition.

Cannot DISKCOMP to or from a Network drive

Explanation: DISKCOMP. You cannot use DISKCOMP to compare files on a network drive or on a drive that is on your computer but is currently being shared on the network.

Action: Use COMP *.* instead of DISKCOMP. If the disk is being shared, you can PAUSE the server, do DISKCOMP, then CONTINUE the server.

Cannot DISKCOPY to or from a Network drive

Explanation: DISKCOPY. You cannot use DISKCOPY to copy files to or from a network drive or a drive that is

on your computer but is currently being shared on the network.

Action: Use COPY *.* instead of DISKCOPY. You can also use the COPY command to copy individual files instead of the whole diskette. Be sure your diskette is formatted. If the disk is being shared, you can PAUSE the server, do DISKCOPY, then CONTINUE the server.

Cannot do binary reads from a device

Explanation: COPY. You used the **/B** parameter with a device name while trying to copy from the device. The copy cannot be performed in binary mode because COPY must be able to detect the end-of-file from the device.

Action: Re-enter COPY and omit the **/B** parameter or use the **/A** parameter after the device name.

Cannot edit .BAK file--rename file

Explanation: EDLIN. Files with the extension .BAK are considered to be backup files, with more up-to-date versions of the files assumed to exist. Therefore, .BAK files shouldn't ordinarily be edited.

Action: If it is necessary to edit the .BAK file, rename the file giving it an extension other than **.BAK**. Or else, copy the file and give the copy a different file name extension.

Cannot Exec BASICA.COM

Explanation: BASIC. BASIC cannot find BASICA.COM.

Action: Ensure that BASICA.COM is in the current directory and try again.

Cannot execute FORMAT

Explanation: BACKUP. Cannot find FORMAT in the current directory or via the path in the environment, or there is not enough memory to load FORMAT.

Action: Insert a formatted diskette and strike a key. To restart the backup procedure, abort the current backup procedure. Be sure that the FORMAT command is accessible and reissue the BACKUP command.

Cannot execute XCOPY

Explanation: SELECT. An error occurred executing XCOPY. You probably did not have the DOS diskette in the source drive.

Action: Insert the DOS diskette with the XCOPY command into the source drive and try again.

Cannot FDISK with network loaded

Explanation: You cannot run FDISK on a fixed drive while the network program is loaded.

Action: Restart the machine, and run FDISK before the network program is started.

Cannot find file *object file*
Change diskette and press < ENTER >

Explanation: LINK. The linker could not locate the specified object module on the drive.

Action: Insert the correct diskette with the *object file* on it and press Enter.

* WARNING: If it is necessary to change the diskette that contains the open VM.TMP file, you need to exit LINK by pressing Ctrl-Break instead of changing diskettes, and then restart LINK with the changing drive specified to locate the object file. Otherwise, there may be a loss of data on the diskette inserted. This usually occurs when using default drive value for the object file.

Cannot find library *library file*
Enter new file spec:

> **Explanation**: LINK. The specified library could not be found on the drive.

> **Action**: Enter the correct letter for the drive the library is on.

> **Warning:** If it is necessary to change the diskette that contains the open VM.TMP file, you need to exit LINK by pressing Ctrl-Break instead of changing diskettes, and then restart LINK with the changing drive specified to locate the object file. Otherwise, there may be a loss of data on the diskette inserted. This usually occurs when using default drive value for the object file.

Cannot find system files

> **Explanation**: FORMAT, SYS. The hidden files IBMBIO.COM and/or IBMDOS.COM were not found, and the current drive is not removable.

> **Action**: Change the current drive to one that has the system files in the root and try again.

Cannot FORMAT a Network drive

> **Explanation:** FORMAT. You cannot use the FORMAT command to format a network drive or a drive on your computer being shared on the network.

> **Action:** If the drive is being shared, you can PAUSE the server, do FORMAT, then CONTINUE the server.

Cannot format a ASSIGNed or SUBSTed drive

> **Explanation**: FORMAT. An ASSIGN or SUBST command was executed before you used FORMAT.

> **Action**: Execute ASSIGN to restore the original drive letter assignment. Then execute FORMAT.

Cannot FORMAT nonremovable drive *x*

Explanation: BACKUP. You specified the /F option and the target is a fixed disk or network drive.

Action: If you must back up to a fixed disk, you must prepare it before issuing BACKUP.

Cannot JOIN to a network drive

Explanation: You cannot use the JOIN command to join a local drive to a network drive or to join a network drive to a local drive.

Action: No action required.

Cannot LABEL a Network drive

Explanation: You cannot create a new or change an existing volume label on a redirected block device.

Action: No action required.

Cannot load COMMAND, system halted

Explanation: DOS. DOS attempted to reload the command processor, but the area in which DOS keeps track of available memory was destroyed; or the command processor was not found in the path specified by the COMSPEC parameter.

Action: Restart DOS. Don't forget to put the DOS diskette in the drive.

Cannot nest response file

Explanation: LINK. You used *@filespec* within an automatic response file. Automatic response files cannot be nested.

Action:

1. Change the initial auto response file to eliminate nested auto response file.

2. Or, fix the syntax error if you did not intend this to be an auto response file.

Cannot open list file

Explanation: LINK. The directory or disk is full.

Action: Insert another disk, or delete some files from the disk that is full.

Cannot open overlay

Explanation: LINK. The directory or disk is full.

Action: Insert another disk, or delete some files from the disk that is full.

Cannot open response file: *filename*

Explanation: LINK. The automatic response file could not be found.

Action: Include drive specifier and/or path for the response file. Place the file on the proper disk.

Cannot open run file

Explanation: LINK. The directory or disk is full.

Action: Insert another diskette, or delete some files from the disk that is full.

Cannot open temporary file

Explanation: LINK. The directory or disk is full.

Action: Insert another disk, or delete some files from the disk that is full.

Cannot perform a cyclic copy

Explanation: XCOPY. The function requested causes the destination to be part of the source. /S parameter was probably specified with XCOPY. The destination is a subdirectory, but the source is a directory above the destination.

Action: Evaluate the tree structure of the source and the destination and use a temporary file or disk to avoid the endless cycle.

Cannot RECOVER Entry, Processing Continued

Explanation: CHKDSK.

Action: No action required.

Cannot RECOVER to a network drive

Explanation: RECOVER. You cannot use the RECOVER command to recover files from a network drive or from a drive on your computer that is being shared on the network.

Action: If the drive is being shared, you can PAUSE the server, do RECOVER, then CONTINUE the server.

Cannot reopen list file

Explanation: LINK. The original diskette was not actually replaced.

Action: Restart the linker.

Cannot start COMMAND, exiting

Explanation: DOS. While DOS was attempting to load another copy of the command processor, either the FILES= parameter in the configuration file was found to contain too small a value, or there is not enough available memory to contain the new copy of COMMAND.COM.

Action:

- Restart DOS.

- If necessary, increase the parameter value of FILES =
parameter in CONFIG.SYS.

Cannot use FASTOPEN for drive *x*

Explanation: FASTOPEN. A JOINed, SUBSTed,
ASSIGNed, diskette drive, or network drive was specified.
FASTOPEN can only be used on fixed disk drives.

Action: Remove the drive reassignment and specify the
true drive letter, or specify only fixed disk drive letters.

Cannot use PRINT - use NET PRINT

Explanation: PRINT. You cannot use the PRINT
command on a network server computer.

Action: Use NET PRINT to print the files.

Cannot SUBST to a network drive

Explanation: SUBST. You cannot use the SUBST
command to substitute a drive for a network path or
substitute a network drive for a local path.

Action: No action required.

Cannot SYS to a network drive

Explanation: SYS. You cannot use SYS to transfer
system files to a network drive or to a drive on your
computer that is currently being shared on the network.

Action: If the drive is being shared, you can PAUSE the
server, do SYS, then CONTINUE the server.

Cannot XCOPY from a reserved device

Explanation: XCOPY. The source specified is a character

device, such as a printer or an asynchronous communication port, or is NULL.

Action: Put the source data into a file and enter XCOPY again using the file as the source.

Cannot XCOPY to a reserved device

Explanation: XCOPY. The destination specified is a character device, such as a printer or an asynchronous communication port, or is NULL.

Action: Specify a file or block device other than NULL as the destination and enter XCOPY again.

CHDIR . . Failed Trying Alternate Method

Explanation: CHKDSK.

Action: Restart DOS and CHKDSK again.

Code page not prepared

Explanation: MODE. MODE failed during a SELECT operations for one of the following reasons:

- the indicated code page had never been defined to the device.

- the prepared code page does not have the correct font to support the current video mode.

Action: Use MODE PREPARE to pass the code page definition to the device, then reissue the MODE SELECT operation to the device. If the error still occurs, increase the number of subfonts (m) in the DEVICE = DISPLAY command in CONFIG.SYS, and restart DOS.

Code page *xxx* not prepared for all devices

Explanation: CHCP. CHCP was unable to select the code page for one of the following reasons:

- a device was not prepared for the requested code page
- a device I/O error occurred
- the device is currently printing
- the device does not support code page switching.

Action: Use the MODE command to prepare all devices for code page switching. Refer to "How to Install Code Page Switching" in Chapter 9. Ensure the printer is on-line and not currently printing. Retry the CHCP command.

Code pages *xxx* not prepared for system

Explanation: CHCP. CHCP was unable to select the specified code page. CHCP cannot select a code page if NLSFUNC has not been loaded; or if the code page is not valid for your country; or if no devices have been prepared with the MODE command.

Action: Ensure that NLSFUNC is loaded and all devices have been prepared for the code page using the MODE command. Refer to "How to Install Code Page Switching" in Chapter 9. Retry the command.

Code page operation not supported on this device

Explanation: MODE. In an attempt to use MODE to PREPARE or SELECT a code page for a device, the specified "device" may have been a file name (not really a device), or it is not a device that supports code pages. The CONFIG.SYS file may not contain the DEVICE = device name command to properly load the device. If the definition on the device is incorrect, the device cannot be properly initialized.

Action: Verify the specification of the device for spelling errors. The specified "device" cannot be a file name. Change the CONFIG.SYS file, restart, and try the MODE command again.

Code page requested *yyy* is not valid for given keyboard code

Explanation: KEYB. KEYB attempted to activate a

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keyboard code page that is not valid for that keyboard.
yyy will display the requested code page.

Action: Using the MODE command, change the selected
code page to one that is valid for the new keyboard, or
specify a code page parameter in the KEYB command.

Code page specified has not been designated

Explanation: The code page specified on the KEYB
command has not been prepared for the CON device.
This message is displayed only if the code page switching
CON device has been installed.

Action: Use the MODE command to prepare the desired
code page.

Code page specified has not been prepared

Explanation: KEYB. You have a CON device driver
loaded that supports code page switching. The code page
specified has not been prepared for CON.

Action: Use the MODE command to prepare CON with
the desired code page.

Code page specified is inconsistent with invoked code page

Explanation: The code page specified on the KEYB
command has been prepared for the CON device, but is
not the currently invoked CON code page. The code
page specified becomes the active keyboard code page. It
is important to note that the CON code page will not be
changed. This means that your CON and keyboard are
operating in different code pages.

Action: This is a warning message only. The keyboard
will be loaded with the code page you requested. You
should use the MODE command to change the invoked
CON code page to match your keyboard code page. The
characters you typed may be displayed incorrectly if your
keyboard and CON are operating in different code pages.

Code page specified is inconsistent with selected code page

> **Explanation**: KEYB. The code page specified has been prepared for the CON device but is NOT the current CON code page. The specified code page is now the active keyboard code page. It is important to note that the selected CON code page is not changed. This means that your display and keyboard are operating in different code pages. The characters you type may be displayed incorrectly while your display and keyboard are operating in different code pages.

> **Action**: Use the MODE command to change the selected code page for the display.

Code page *xxx*

> **Explanation**: MODE. In response to the MODE status request, the device is identified as having both a set of hardware and prepared code pages, as listed by a series of these messages immediately following the message, **hardware code pages:** or **prepared code pages:**.

> **Action**: No action. Information only. If desired, use the MODE PREPARE command to pass the code page definitions to the device.

Code pages cannot be prepared

> **Explanation**: MODE. Either there are code pages duplicated on the device, or there are more code pages specified than the total number of code pages allowed for the device (PRN, LPT, or CON). For the IBM Quietwriter III Printer Model 5202 device, the code page cannot be a duplicate of the hardware code page (*hwcp*) specified by the DEVICE command in the CONFIG.SYS file.

> **Action**: Respecify the MODE command. Check the number of code pages allowed by displaying the list of code pages using the MODE/STATUS command.

COM: ,e,7,1
Compare error(s) on
Track *xx***, side** *xx*

> **Explanation**: DISKCOMP. One or more locations on the
> indicated track and side contain different information
> when the diskettes are compared.
>
> **Action**: This message is to inform you that there is a
> difference between diskettes. If you want an exact copy
> of a diskette, use DISKCOPY.

Command format: DISKCOPY d: d: [/1]

> **Explanation**: DISKCOPY. An invalid parameter or file
> name was typed.
>
> **Action**: Check the command format, and re-enter the
> command.

Common area longer than 65536 bytes

> **Explanation**: LINK. User's program has more than 64K
> of communal variables.
>
> **Action**: Rewrite your program using fewer or smaller
> communal variables.

COMn: bbbb,p,d,s,t initialized

> **Explanation**: MODE. Informational message. The
> Asynchronous Communications Adapter is initialized.
> The values represent:

n	adapter (COM1, COM2, COM3, or COM4)
bbbb	baud rate
p	* pa rity
e	even
o	odd
n	none
d	data bits
s	stop bits (1 or 2)
t	type of serial device

p   serial printer (serial timeouts will be retried)

-   other serial device (serial timeouts will not be retried)

Action: No action required. The feedback message from MODE shows its interpretation of the MODE command and the parameters you entered.

Compare error at offset *xxxxxxxx*

Explanation: COMP. Informational message. The files being compared contain different values at the displayed offset (in hexadecimal) into the file. The differing values are also displayed in hexadecimal.

Action: No action required.

Compare more diskettes (Y/N)?

Explanation: DISKCOMP.

• This message indicates completion of DISKCOMP.

• You may compare more than one set of diskettes without re-entering the DISKCOMP command.

Action: To compare another pair of diskettes, enter **Y**, and DISKCOMP instructs you to insert the required diskettes. If you do not want to compare any more diskettes, enter **N**.

Compare more files (Y/N)?

Explanation: COMP. COMP has finished comparing files. You may compare more files without re-entering the COMP command.

Action:

• To compare the contents of two more files, enter **Y**, and COMP asks you enter the names of the files to compare.

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- If you do not wish to compare more files, enter **N**.

Compare process ended

> **Explanation:** DISKCOMP. This is an informative message indicating that DISKCOMP is finished comparing.

> **Action:** No action required.

Comparing *x* sectors per track, *n* side(s)

> **Explanation:** DISKCOMP. The *x* indicates the number of sectors per track found on the first diskette (8 or 9). If you use **/8**, then the number 8 appears. The *n* will be either 1 or 2, indicating the number of sides that DISKCOMP will compare on the two diskettes. This number is determined by the number of sides DISKCOMP was able to successfully read from the first track of the first diskette.

> **Action:** If *x* or *n* is not what you expected, let DISKCOMP finish comparing diskettes. Re-enter the DISKCOMP command with or without additional parameters.

Configuration too large for memory

> **Explanation:** DOS. Occurs when the number specified for the SHELL= with /E specified, the FILES or BUFFERS commands in the CONFIG.SYS file does not leave enough room for DOS to be loaded. The size specified on /E on the COMMAND command does not leave enough room for COMMAND.COM to be loaded.

> **Action:** Restart DOS with a different diskette and reduce the value specified for the FILES and/or BUFFERS commands, or the /E option.

Contains *xxx* non-contiguous blocks

> **Explanation:** CHKDSK. Informational message. The file name preceding this message means that the file is not

written sequentially on the disk—it is written in *xxx* pieces on different areas of the disk.

This message is for your information and does not indicate a problem with the disk.

Action: Since fragmented files take longer to read, you should consider copying badly fragmented files to another disk with the COPY command. This will record the file sequentially, resulting in better system performance when the file is read.

Convert directory to file (Y/N)?

Explanation: CHKDSK. The directory name preceding this message means the directory contains too much invalid information to be usable as a directory.

Action:

• If you reply **Y**, CHKDSK will convert the directory to a file so that you may examine it with DEBUG.

• If you reply **N**, the entry is not changed.

***xxx* lost clusters found in *yyy* chains.**
Convert lost chains to files (Y/N)?

Explanation: CHKDSK. Ctrl-Break was entered during a disk I/O operation. CHKDSK did not clean up the disk after encountering the Ctrl-Break.

Action:

• If you reply **Y** and you have used the /F parameter, CHKDSK will recover each chain into a separate file.

• If you reply **N**, CHKDSK frees the blocks up so they can be allocated to new files.

• If CHKDSK was specified (no /F), then messages displayed afterwards are informational (no corrective action was taken).

Copy another (Y/N)?

Explanation: DISKCOPY. This message allows you to make exact images of additional diskettes without re-entering the DISKCOPY command.

Action:

- If you wish to copy another entire diskette, enter **Y**. DISKCOPY asks you to insert the required diskettes.

- If you do not wish to make any more copies, enter **N**.

Copy complete

Explanation: DISKCOPY. Informational message.

Action: No action required. The source diskette contents have been successfully copied to the target diskette.

Copying *xxx* tracks
x sectors per track, *n* sides

Explanation: DISKCOPY. The *xxx* will be 40 or 80 tracks. The *x* will be 8, if the diskette was formatted using DOS 1.1; or 9, if the diskette was formatted with DOS 2.00 or 2.10; or 15 if the diskette was formatted using DOS 3.00. The *n* is either 1 or 2 indicating the number of sides. If the diskette has been formatted double sided and subsequently formatted single sided, DISKCOPY will say it is copying *2 side(s)*. In this situation, use DISKCOPY /1.

If the diskette was formatted with FORMAT /8, DISKCOPY will say **Copying 9 sectors**. This is due to the fact that FORMAT will format the disk with 9 sectors, but initializes 8. DISKCOPY mimics FORMAT in that it says, **Copying 9 sectors**, but the target diskette ends up with 8 sectors per track.

Action: No action required.

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Current code page settings

> **Explanation**: MODE. In response to the MODE GET GLOBAL code page function, this title is listed as a heading, to be followed by the identification of the Active and System Global code pages. Information only.

> **Action**: No action.

Current drive is no longer valid

> **Explanation**: COMMAND. While attempting to get the current drive for the DOS prompt ($p), COMMAND found that the drive is no longer valid. This can occur if your current drive is a network drive and you delete the network drive.

> **Action**: Change your current drive to a valid drive.

Current keyboard code: *xx* code page: *yyy*
Current CON code page: *zzz*

> **Explanation**: KEYB. Information message indicating the specified keyboard code, the code page of the keyboard, and the CON code page.

> **Action**: None.

Current keyboard does not support this code page

> **Explanation**: MODE. While attempting to perform a MODE PREPARE code page function, the device has detected a discrepancy between the currently defined keyboard code and the specified code page.

> **Action**: Adjust the KEYB specification to reference the desired code page definitions and reissue the MODE PREPARE code page function.

D

d: drive deleted

> **Explanation**: Status message. The logical DOS drive indicated in the extended DOS partition has been deleted.

> **Action**: No action required.

Data record too large

> **Explanation**: LINK. The LEDATA record contains more than 1024 bytes of data.

> **Action**: This is a translator error. Note the translator (compiler or assembler) that produced the incorrect object module and the circumstances under which it was produced, and report the information to your dealer.

Delete current volume label (Y/N)?

> **Explanation**: LABEL. You can avoid deleting the existing label by pressing Enter rather than typing a new volume label.

> **Action**: Type **n** to keep the current label.

Device error during Status
Device error during Prepare
Device error during Select
Device error during write of font file to device

> **Explanation**: MODE. During the indicated operation of the MODE code page function, the device returned a device error. The device may not support code page functions; or it is not defined to contain sufficient code pages to meet the request; or the device detected certain types of invalidities within the font file contents. The CONFIG.SYS file may not contain the DEVICE = device name command to properly load the device.

> **Action**: Verify that the proper device name was specified. Change the CONFIG.SYS file, restart, and try the MODE command again.

Device or code page missing from font file

Explanation: MODE. After transmitting the specified font file to the device handler during a PREPARE operation, DOS responded with an error indicating that the font file does not contain a definition of the indicated code page for the specified device. For the IBM Quietwriter III Printer Model 5202, a hardware code page (*hwcp*) may also generate this error, if the *hwcp* is not defined in the font file.

Action: Respecify the MODE command indicating a different code page that is supported by the device. Check the description of the various font files to verify the device and code page combinations supported. For the IBM Quietwriter III Printer Model 5202, if the *hwcp* value is creating the error, then correct the DEVICE command in the CONFIG.SYS file for the printer, and restart DOS.

Note: The error causes the existing code pages to be undefined. All specified code pages need to be prepared again. See the MODE command in Chapter 7.

Device *ddd* not prepared

Explanation: MODE.
Where:
ddd = device name

In response to a MODE code page status request, the indicated device has not received any code page definitions via a MODE PREPARE command. This operation is required before performing the MODE SELECT operation.

Action: No action required. Information only. If desired, use the MODE PREPARE command to pass the code page definitions to the device.

Explanation: DEBUG. Double flag. Conflicting codes were specified for a single flag. DEBUG is informing you that a flag can be changed only once per register (R F) command.

Action: No action required.

Dir path listing for volume *xxxxxxx*

Explanation: TREE. Informational message telling you the volume label of the disk.

Action: No action required.

Directory entries adjusted

Explanation: VDISK. VDISK found it necessary to adjust the number of directory entries in the DEVICE = VDISK.SYS in the CONFIG.SYS command.

Action: No action required.

Directory is joined,
tree past this point not processed.

Explanation: CHKDSK. This is an informational message. Joining a drive to another tree extends the tree. The allocation on the joined device is completely separate, and there is no reason to CHKDSK across devices. CHKDSK is skipping over the joined device.

Action: No action required.

Directory is totally empty, no . or ..,
tree past this point not processed.

Explanation: A subdirectory was found that did not properly contain a . or .. This usually happens when DOS is not given a chance to update the disk properly. During the updating process, the system may have shut

down, or you may have reloaded the system before DOS finished the update.

Action: Use the RECOVER command to try to recover files on the damaged disk.

Disk boot failure

Explanation: DOS. An error occurred when you tried to load DOS into memory.

Action: Restart the system. If subsequent attempts to start the system also fail, place a backup DOS diskette in drive A and restart your system.

Disk error reading drive x

Explanation: You tried to read absolute sectors on a network drive. This cannot be done.

Action: If possible, use the Loader Write filespec option of this DEBUG command.

Disk error reading FAT X

Explanation: CHKDSK. The File Allocation Table indicated is invalid. This can be caused by a power failure while a file is open.

Action: If this message appears twice for FATs 1 and 2, format the disk to make it usable again. If FORMAT fails, the disk is probably unusable.

Disk error writing drive x

Explanation: You tried to write to absolute sectors on a network disk. This cannot be done.

Action: If possible, use the Loader Write filespec option of this DEBUG command.

Disk error writing FAT *X*

   Explanation: CHKDSK. A disk error was encountered
   while CHKDSK was attempting to update the file
   allocation table (FAT) on the specified drive. *X* will be 1
   or 2, depending on which of the two copies of the file
   allocation table could not be written.

   Action: If this message appears twice for FATs 1 and 2,
   format the disk to make it usable again. If FORMAT
   fails, discard the disk since it is probably unusable.

Disk full. Edits lost

   Explanation: EDLIN. An End Edit command ended
   abnormally because the disk is full (not enough free space
   to save the entire file). Any editing done to the file is
   lost.

   Action: Obtain a new diskette, copy the file onto the new
   diskette, and start editing again.

Disk not compatible

   Explanation: FORMAT. You cannot use the DOS
   FORMAT command to format a diskette using the drive
   you specified. This message informs you that the drive
   you specified is not supported by the IBM device
   interfaces that FORMAT requires.

   Action: Use a compatible disk drive.

Disk unsuitable for system disk

   Explanation: FORMAT. A defective track was detected
   where the DOS files were to reside.

   Action: The diskette can be used only for data. Use
   another disk if you wish to copy DOS files.

Diskette/Drive not compatible

   Explanation:. DISKCOPY, DISKCOMP. The destination

diskette/drive is different from the source diskette/drive in a way that prohibits the copy or compare. For example, you cannot DISKCOPY a double-sided diskette to a single-sided diskette or DISKCOMP a 1.2MB diskette in a 320/360KB drive with a 1.2MB diskette in a 1.2MB drive.

Action: Match the diskette/drive types and try again.

Diskettes compare OK

Explanation: DISKCOMP. Informational message. The two diskettes just compared contain identical information.

Action: No action required.

Divide overflow

Explanation: DOS. A program tried to divide a number by zero, or a logic error caused an internal malfunction. The program ends and you return to DOS.

Action: Correct the programming error and continue. If this is a purchased program, take it back to your dealer.

Do you see the leftmost 0? (Y/N)

Explanation: MODE. The ,R,T parameter was specified.

Action: Respond Y or N. This prompt is repeated until you respond Y.

Do you see the rightmost 9? (Y/N)

Explanation: MODE. The ,L,T parameter was specified.

Action: Respond Y or N. This prompt is repeated until you respond Y.

MESSAGES

Do you wish to use the maximum
size for a DOS partition and make
the DOS partition active (Y/N).....[ ]

> **Explanation**: FDISK. Displayed when the "Create
> Primary DOS Partition" option is selected. The prompt
> will only be displayed when you select the disk 1 option.

> **Action**: If you select the **Y** option, a primary DOS
> partition is created in the largest available free space on
> the disk, up to 32MB. The partition will be marked
> active.

Does < pathname > specify a file name or directory name
on the target (F = file, D = directory)?

> **Explanation**: XCOPY. This is a warning that XCOPY
> did not find a directory named < pathname > on the
> target. If you answer "D," XCOPY attempts to create a
> directory called < pathname > on the target.

> **Action**: If you are copying more than one file you most
> likely want to answer "D." Evaluate what is really
> intended, and choose appropriately.

DOS partition already exists

> **Explanation**: FDISK. The partition table on the target
> fixed disk indicates that a partition for DOS has already
> been set up.

> **Action**: Return to FDISK options screen and make a
> different selection.

Drive d: already deleted

> **Explanation**: You have already deleted the logical DOS
> drive letter in the extended DOS partition.

> **Action**: The display above this message on the FDISK
> screen shows what logical DOS drives have been deleted.
> No action required.

Drive letter must be specified

Explanation: FORMAT. You must enter a drive letter.

Action: Re-enter the parameters and include the drive letter for the disk to be formatted.

**Drive letters have been changed
or deleted**

Explanation: One or more logical DOS drives have been deleted from the extended DOS partition. The drive letter assignments for any remaining logical drives may have changed, because DOS will assign drive letters to logical DOS drives based on the physical location of these drives in the extended DOS partition.

Action: Note the new drive letter assignments on the FDISK menu for the new drive letter assignments.

Drive types or diskette types not compatible

Explanation: DISKCOMP or DISKCOPY. The source and target diskettes or drives are not compatible.

Action: Refer to the DISKCOMP or DISKCOPY commands for the allowable combinations.

DUP record too complex

Explanation: LINK. A DUP record in an assembler source program is too deeply nested or too complicated for the linker to expand. A single DUP requires 1024 bytes before expansion.

Action: Reduce the number of structures or DUP statements in the assembler source program, create a new object module, and retry LINK.

Duplicate file name or file not found

Explanation: RENAME. You tried to rename a file to a file name that already exists on the diskette, or the file to

MESSAGES

be renamed could not be found on the specified (or default) drive. RENAME is warning you that you are using the same name for two files, or else it cannot find the file you are trying to rename.

Action: Check to see if you type the file name correctly. Re-enter the RENAME command.

E

Enter current Volume Label for Drive d (Press ENTER for none):

Explanation: FORMAT. FORMAT requires a volume label to prevent you from inadvertently formatting your fixed disk.

Action: Follow the instructions on the display.

Enter partition size............: [dddd]

Explanation: FDISK. The "Create DOS Partition" option is requesting that you enter the size of the partition you wish to create.

Action: The number shown in the brackets is the default size. If you only press Enter, that size will be used as the partition size. Otherwise, enter the desired size, then press Enter.

Enter primary file name

Explanation: COMP. DOS asks you for primary file name.

Action: Enter the filespec of the first of two files to be compared.

Enter 2nd file name or drive id

Explanation: COMP. DOS asks you for the filespec of the second of the two files you want compared.

Action: Enter the filespec of the second of two files to be compared, or just enter the drive letter if the file name is the same as for the primary file name.

Enter starting cylinder number..: [dddd]

> **Explanation**: FDISK. The "Create DOS Partition" option is requesting that you enter the starting cylinder number for the DOS partition you are creating. The value in the brackets is the default value. It is the starting cylinder of the largest piece of free space on the current fixed disk.

> **Action**: Type the starting cylinder number and press Enter, or just press Enter to use the default value.

Enter the number of the partition you want to make active................: [ ]

> **Explanation**: FDISK. The "Change Active Partition" option is requesting you to enter the number of the partition you want to make active.

> **Action**: Type the number of the partition that you want to make active on the current fixed disk. Then press the Enter key.

> > **Note**: The partitions are displayed above the prompt.

Entry Error

> **Explanation**: EDLIN. EDLIN has detected a syntax error.

> **Action**: Correct the syntax error on the last command.

**Entry has a bad attribute
(or size or link)**

> **Explanation**: CHKDSK. This message may begin with one or two periods, indicating which entry in the subdirectory was in error. One period indicates the current directory is in error. Two periods mean the

parent directory is in error. If you did *not* enter the /F
parameter, no corrective action is taken.

Action: Enter: CHKDSK /F. CHKDSK will then try to
correct the error.

EOF mark not found

Explanation: COMP. COMP could not find the end of
valid data in the last block of the files being compared.
This message usually occurs when comparing non-text
files; it should not occur when comparing text files.

Action: For more details, see the COMP command in
Chapter 7.

Error during read of font file

Explanation: MODE. While attempting to perform a
MODE PREPARE code page function, the record from
the specified code page font file had an unrecoverable I/O
error. The code page definition sent to the device is
incomplete.

Action: Try to determine the nature of the readability
problem and restore the file from a master copy, or direct
MODE to an alternate device to access a copy of the file.

Error found, F parameter not specified
Corrections will not be written to disk

Explanation: CHKDSK. Informational message. An
error was found and you have not used the /F parameter.
CHKDSK performs its analysis as though it were going
to correct any errors detected, so that you can see the
results of its analysis, but it will not actually write the
corrections on the disk.

Action: No action required.

Error in COUNTRY command

Explanation: DOS. The code page was missing from the

COUNTRY command and the default was not requested (by specifying: *xxx,,[d:][path]filename[.ext]*), or the country information file:

- is not in correct format

- contains invalid information.

Action: Verify that the country information is correct, or correct the COUNTRY= command in the CONFIG.SYS file and restart.

Error in EXE file

Explanation: DOS. An error was detected in the relocation information placed in the file by the LINK program. This may be due to a modification to the file.

Action:

- If you are using a purchased program, rerun the program using your backup copy.

- If you still have trouble, see your authorized IBM dealer.

- If you are using a program you wrote yourself, go through the LINK procedure again.

Error in EXE or HEX file

Explanation: DEBUG. The file contained invalid records or characters.

Action: Get another copy of the program, and run DEBUG again.

Error loading operating system

Explanation: DOS. A disk error occurred while attempting to load your operating system from fixed disk.

Action: Restart the system. If the error persists after several tries, restart the system, (you should start DOS from your DOS diskette) and use the SYS command to transfer a new copy of DOS to your fixed disk.

Error opening log file

Explanation: BACKUP. You specified the /L option requesting a log file, and an error was encountered opening or creating the log file. Some of the errors that may have occurred are:

- Invalid drive
- Invalid path
- File sharing conflict
- No more directory entries available in the root.

Action: If you specified a log file, make sure the drive and path specified for the log file are valid and try again. Remember that the log file cannot be on the target disk. If you did not specify a log file name, then an error occurred opening or creating the log file on the source.

Error reading fixed disk

Explanation: FDISK. The FDISK program was unable to read the startup record of the current fixed disk after five tries.

Action: Try the FDISK program again. If after several tries you still get the same error, consult the IBM *Guide to Operations*, "Problem Determination" section. If you still cannot solve the problem, see your authorized IBM dealer.

Error reading partition table

Explanation: FORMAT. An error (probably hardware) occurred while reading the partition table.

Action: Run FDISK on the drive and try again.

Error writing fixed disk

> **Explanation**: FDISK. The FDISK program was unable to write the startup record of the current fixed disk after five tries.

> **Action**: Try the FDISK program again. If after several tries you still get the same error, consult the IBM *Guide to Operations*, "Problem Determination" section. If you still cannot solve the problem see your authorized IBM dealer.

Error writing partition table

> **Explanation**: FORMAT. An error (probably hardware) occurred while reading the partition table.

> **Action**: Run FDISK on the drive and try again.

Error writing to device

> **Explanation**: COMMANDS. Informational message. DOS encountered an I/O error when writing output to a device. The device is unable to handle the number of bytes requested.

> **Action**: Change the amount of data in the file and retry the command.

Errors on list device indicate that
it may be off-line. Please check.

> **Explanation**: PRINT. The device being used for background printing is off line. This message only appears when the device is off line and you enter a new PRINT command.

> **Action**: Make sure the printing device is connected and switched on.

EXE and HEX files cannot be written

> **Explanation**: DEBUG. This error normally occurs when

you load a .HEX or .EXE file, modify it, and then attempt to write the file back to a diskette.

.EXE and .HEX files contain loading information that is used to load the file. When DEBUG is executed, it loads the .EXE file while at the same time discarding the loading information. During direct execution of an .EXE file, the same thing happens. When you use DEBUG to write an .EXE file, the loading information is gone; therefore, a correct .EXE file cannot be generated. You get this error message because the loading information is missing.

The error might also be caused because the data consists of a .COM file loaded in with DEBUG and you are now trying to write it to an .EXE or .HEX file. This is not possible. The data requires a backward conversion that DEBUG doesn't support.

Action: Rename the file using a different extension, then execute DEBUG. DEBUG then *reads* the file in instead of loading it, and the file can now be written out. Reading the file in does not alter the records or data in the file.

EXEC failure

Explanation: COMMANDS. DOS encountered an error while reading a command from disk, or the FILES = command in the configuration file (CONFIG.SYS) does not specify a large enough value.

Action: Increase the FILES = value. Restart DOS. If restarting DOS does not work, then there may be a problem with the disk itself.

Extended DOS partition already exists

Explanation: FDISK. Only one extended DOS partition can exist on the fixed disk.

Action: Use option 4 (display partition information) on the main FDISK menu to display what partitions exist on the fixed disk.

Extended DOS partition created

Explanation: Status message. An extended DOS partition was created on the fixed disk. No drive letter is assigned to this partition. This only reserves space for you to create logical DOS drive letters in this partition.

Action: In order to use this space, you should create one or more logical DOS drives in this partition using FDISK. Then you must format the drive created with the FORMAT command before you can use the created drive.

Extended DOS partition deleted

Explanation: Status message. The extended DOS partition and its contents have been deleted from the fixed disk.

Action: No action required.

Extender card switches do not match the system memory size

Explanation: VDISK. The extender card switch settings do not reflect the total amount of memory in the system unit. Although the extender card switch settings may be set correctly for your system, VDISK does not support memory in an expansion unit.

Action: Check the settings on the extender card.

F

Failure to access Code page Font File

Explanation: MODE. During a PREPARE, the attempt to access the indicated code page font file failed.

Action: Verify the spelling of the font file name. Verify the presence of the specified font file. Reissue the MODE command with the proper specification of the font file name.

Failure to access COUNTRY.SYS

Explanation: SELECT. The attempt to open the COUNTRY.SYS file failed while trying to verify the three-digit country code. The SELECT operation is aborted.

Action: Be sure the source diskette (as identified by the first parameter) has a copy of the COUNTRY.SYS file. With the proper diskette in place, repeat the SELECT operation.

Failure to access device: *xxx*

Explanation: During a CODE PAGE operation, the opening of the specified DEVICE failed.

Action: Verify the spelling of the DEVICE name and reissue the MODE command with the proper spelling. If that fails to correct the situation, then be sure the specified DEVICE has been loaded by the CONFIG.SYS DEVICE = command, or that the DEVICE is a standard device always present. If the CONFIG.SYS is incorrectly specified, edit that file to the proper specification and restart before retrying the MODE command.

Failure to access KEYBOARD.SYS

Explanation: SELECT. The attempt to open the KEYBOARD.SYS file failed while trying to verify the two-character keyboard code. The SELECT operation is aborted.

Action: Be sure the source diskette (as identified by the first parameter) contains a copy of the KEYBOARD.SYS file. With the proper diskette in place, repeat the SELECT operation. If this file is inaccessible, then SELECT cannot function, and the KEYB.COM utility

will fail, thus allowing the keyboard to be used only in US mode.

FASTOPEN already installed

Explanation: FASTOPEN. FASTOPEN has already been loaded and can be loaded only once.

Action: None.

FASTOPEN installed

Explanation: FASTOPEN. FASTOPEN has been successfully loaded.

Action: None.

File allocation table bad, drive x
Abort, Retry, Ignore?

Explanation: DOS.

Action: See the message **Disk error reading drive** x under "Device Error Messages" at the beginning of this appendix. If this error persists, the disk is unusable and should be formatted again.

File AND File

Explanation: COMP. Informational message. This message indicates the full path and file names of the two files being compared.

Action: No action required.

File xxx **canceled by operator**

Explanation: PRINT. Informational message. This message appears on the printer after you cancel the printing of a file to serve as a reminder that the printout is incomplete.

Action: No action required.

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File Cannot be Converted

Explanation: EXE2BIN.

Action: See the section on EXE2BIN in the *DOS Technical Reference* for information.

File cannot be copied onto itself

Explanation: COPY or XCOPY. You tried to COPY a file and place the copy (with the same name as the original) in the same directory and on the same disk as the original file.

Action: Change the name given to the copy, or put it in a different directory, or put it on another disk.

File creation error

Explanation: DOS and COMMANDS. An unsuccessful attempt was made to add a new file name to the directory or to replace a file that was already there.

Action: If the file was already there, check to see if the file is marked "read only" and cannot be replaced. Otherwise, run CHKDSK to determine if the directory is full, or if some other condition caused the error.

File is cross-linked:
on cluster *xx*

Explanation: CHKDSK. This message appears twice for each cross-linked cluster number, naming the two files in error. The same data block is allocated to both files.

Action: No corrective action is taken automatically. You must correct the problem by doing the following:

1. Make copies of both files (the COPY command).

2. Delete the original files (the ERASE command).

3. Review the files for validity and edit as necessary.

filename **is currently being printed**
filename **is in queue**

> **Explanation**: PRINT. Informational message. These
> messages appear together when you issue a PRINT
> command with no parameters. They occur individually
> when you queue the first or a subsequent file for printing.
>
> **Action**: No action required.

File is READ-ONLY

> **Explanation:** EDLIN. The file you specified is read-only.
>
> **Action:** Use the ATTRIB command to change the
> attribute of the file to read-write.

File name must be specified

> **Explanation:** EDLIN. You typed EDLIN without
> specifying the file that you wanted to edit.
>
> **Action:** Type the file name on the command line when
> you use EDLIN.

File not found

> **Explanation**: DOS and COMMANDS. A file named in a
> command or command parameter does not exist in the
> directory of the specified (or default) drive.
>
> **Action**: Retry the command using the correct file name.

File not in print queue

> **Explanation**: PRINT. The file you want to cancel is not
> in the print queue.
>
> **Action**: No action required.

File sharing conflict

>Explanation: COMP. Unable to compare files because one file is in use by another process.

>Action: Try the compare again at a later time.

Files are different sizes

>Explanation: COMP. Informational message. The sizes of the files to be compared do not match. This means that a comparison cannot be done because one of the files contains data which does not match the data in the other file.

>Action: No action required.

Files compare OK

>Explanation: COMP. Informational message. The two files just compared contain identical information.

>Action: No action required.

*** Files were backed up *xx/xx/xxxx* ***

>Explanation: RESTORE. Informational message. The files on the backup diskette were backed up on the indicated date.

>Action: No action required.

First cluster number is invalid, entry truncated

>Explanation: CHKDSK. Informational message. The file whose name precedes this message contains an invalid pointer to the data area. If you specify the /F parameter, the file will be truncated to a zero-length file.

>Action: No action required.

Fixed backup device *d:* is full

Explanation: BACKUP. The fixed disk media target is full. Therefore, no more files can be backed up onto that device.

Action: No action required.

Fixup offset exceeds field width near *xxxx* in *xxxxxx* offset *xxxx*

Explanation: LINK. Some possible causes:

- A group is larger than 64K bytes.
- The linker has been asked to correct an intersegment short jump or intersegment short call.
- A data item's name conflicts with that of a subroutine in a library included in the link.
- In an assembly language source file, you have an EXTRN declaration inside the body of a segment.
- A data item (DB, DW, etc.) is declared outside all segments.
- A segment register is being used in a manner contrary to the use declared in the active ASSUME statement.

Action: Revise the source and recreate the object file.

Fixups needed - base segment (hex):

Explanation: EXE2BIN. The source (.EXE) file contains information indicating that a load segment is required for the file.

Action: Specify the absolute segment address at which the finished module is to be loaded.

> **Note:** We do not recommend using such a program as a .COM file because the program is dependent upon being loaded at a specific memory location.

Font file contents invalid

Explanation: MODE. After transmitting the specified font file to the device driver during a PREPARE operation, DOS responded with an error indicating that the font file is not in the proper format. The file indicated may not be a font file, or the font file has been damaged, altered, or truncated.

Action: Verify that the proper name of the font file has been specified, and repeat the MODE command with the proper spelling of the font file. Compare the font file with the master copy to see if it has been altered and replace with a new copy from the DOS Start-Up Diskette or DOS Start-Up/Operating Diskette.

> **Note:** The error causes the existing code pages to be undefined. All specified code pages need to be prepared again. See the MODE command in Chapter 7.

FOR cannot be nested

Explanation: Batch file. More than one FOR subcommand was found on one command line in the batch file.

Action: Use only one FOR subcommand per command line. Then retry the command.

Format failure

Explanation: FORMAT. A disk error was encountered while creating the target disk.

Action: The disk is unusable. Use another disk and retry the command.

FORMAT not supported on Drive d

Explanation: FORMAT. The disk device driver does not support or incorrectly handles generic IOCTL calls (Function call 44 AL = 0DH) for Get Device Parameters,

Set Device Parameters, and/or Format/Verify/Read/Write Track. Virtual drives (VDISK) are set up pre-formatted and cannot be reformatted.

Action: If you have replaced the default (DOS's) disk device driver at set up time, remove that "DEVICE = " command from your CONFIG.SYS file and try again. If you are using only the default disk device drivers, then reinstall DOS on the disk you boot from and try again.

Formatting while copying

Explanation: DISKCOPY. Informational message. The target diskette was found to contain unformatted tracks. DISKCOPY will format the remainder of the target diskette as it copies data.

Action: No action required.

> **Note:** If this message is followed by the message **Incompatible drive types**, you tried to copy a dual-sided diskette to a drive that does not have dual-sided capability. This cannot be done. Processing ends and the target diskette contains no useful data.

H

Hardware code pages:
Prepared code pages:

Explanation: MODE. In response to the MODE status request, the device is identified as having both a set of hardware and prepared code pages, as listed following this message.

Action: No action. Information only. If desired, use the MODE PREPARE command to pass the code page definitions to the device.

Has invalid cluster, file truncated

Explanation: CHKDSK. The file name preceding this

message means that the file contains an invalid pointer to the data area.

Action: Use the /F parameter to truncate the file at the last valid data block. No corrective action occurs if CHKDSK is executed without the /F parameter.

Head: h Cylinder: c

Explanation: FORMAT Informational message displaying the part of the disk media that is currently being formatted.

Action: No action required.

I

Illegal Device Name

Explanation: MODE. The specified printer must be LPT1, LPT2 or LPT3. The specified Asynchronous Communications Adapter must exist and be COM1, COM2, COM3 or COM4.

Action: Use the correct device name and retry the command.

Incompatible system size

Explanation: SYS. The target diskette contained a copy of DOS that is smaller than the one being copied. The system transfer does not take place.

Action: Format a blank diskette (use the FORMAT /S command) and then copy any files to the new diskette.

Incorrect APPEND version

Explanation: APPEND. You are using a version of APPEND that does not match the version you initially loaded. You may be using the version that comes with the IBM Local Area Network program.

Action: Determine why you are accessing the wrong version (often the result of your PATH setting) and change your setup to find the PC DOS version of APPEND.

Incorrect DOS version

Explanation: The command you attempted to use is not intended to be used with the version of DOS your system was set up with.

Action: If you set up with DOS 3.30, be sure the DOS commands you use are from the DOS 3.30 diskettes. Network users accessing DOS commands across the network should edit the PATH statement in the NETPATH.BAT file, replacing the "D:\APPS\DOS" reference with a local reference to DOS, for example, A:\ or C:\DOS.

Incorrect DOS version, use DOS 2.00 or later

Explanation: LINK. LINKER will not run on versions of DOS prior to DOS 2.00.

Action: Restart your system with DOS 2.00 or a later version and try linking again.

Incorrect number of parameters

Explanation: COMMANDS. You entered a different number of parameters than is valid for the command.

Action: Correct the command parameters and try again.

Incorrect parameter

Explanation: SHARE. A parameter specified in the SHARE command is invalid.

Action: Check the command syntax and retry the command.

Incorrect parameter

> **Explanation**: GRAFTABL. A parameter was specified that was not recognized. The contents of any code page table that may have been previously loaded is not changed. This message is followed by the HELP display.

> **Action**: Check the parameters and try again.

Infinite retry on parallel printer time-out

> **Explanation**: MODE. "P" was specified in Option 1, requesting continuous retry on time-out errors.

> **Action**: No action required.

Infinite retry not supported on Network printer

> **Explanation**: MODE. Infinite retry was requested by specifying "P" in option 1. Printer errors cannot be sensed through the network interface.

> **Action**: Do not specify "P," or use a non-redirected printer.

Insert backup diskette *xx* in drive *x*:
Strike any key when ready

> **Explanation**: RESTORE.

> **Action**: Insert the backup diskette(s) in sequence in accordance with the prompt. Press any key and RESTORE will continue.

Insert backup source diskette in drive *x*
Strike any key when ready

> **Explanation**: BACKUP. Informational prompt telling you to insert the source backup.

> **Action**: Insert the source in drive *x* and strike any key.

Insert backup target diskette *y* **in drive** *x*
Strike any key when ready

> **Explanation**: BACKUP. Informational prompt telling you to insert the target backup diskette.

> **Action**: Insert the target in drive *x* and strike any key.

Insert disk with batch file
and strike any key when ready

> **Explanation**: DOS. The diskette that contained the batch file being processed was removed. The batch processor is trying to find the next command in the file.

> **Action**: Insert the diskette in the appropriate drive and press any key. Processing will continue.

Insert disk with \COMMAND.COM in drive *x*
and strike any key when ready

> **Explanation**: DOS. DOS is attempting to reload the command processor, but COMMAND.COM is not in the drive that DOS was started from.

> **Action**: Insert the DOS diskette in the indicated drive and press any key.

Insert diskette for drive *x* **and press any key**
when ready

> **Explanation**: DOS. In a system with logical drives, a drive that is not the current default drive is being referenced, so DOS is asking for the diskette corresponding to that drive.

> **Action**: If the diskette for *x* is different than the one currently in the drive, insert the appropriate diskette and press any key.

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Insert DOS disk in *x*
and strike any key when ready

> **Explanation**: FORMAT. FORMAT is trying to load the
> DOS files, but the indicated drive *x* does not contain the
> DOS diskette.
>
> **Action**: Follow the prompt and insert the DOS diskette.
> Press any key and processing continues.

Insert DOS diskette in drive A:
Press any key when ready . . .

> **Explanation**: FDISK. You have successfully created the
> DOS partition on the current fixed disk.
>
> **Action**: Insert the DOS diskette into drive A and press
> any key. This restarts your computer. The current fixed
> disk is now assigned a fixed disk letter and you can now
> FORMAT the fixed disk.

Insert first diskette in drive *x*
Insert second diskette in drive *x*

> **Explanation**: DISKCOMP.
>
> **Action**: Insert the first (or second) of the two diskettes to
> be compared into the indicated drive. One or both of
> these messages is followed by the message **Strike any key**
> **when ready**. Press a key and the comparison starts.

Insert last backup diskette in drive *x*

> **Explanation**: BACKUP. Informational prompt. The /A
> parameter was specified.
>
> **Action**: Insert the last backup target used in the previous
> backup.

Insert new diskette for drive x
and press ENTER when ready

> **Explanation**: FORMAT. Prompt asking you to insert the diskette you want to format.

> **Action**: Insert the diskette you want to format and press Enter.

Insert restore target xx **in drive** yy
Strike any key when ready

> **Explanation**: RESTORE. This is the informational prompt for removable media.

> **Action**: Insert the target in drive yy and strike any key.

Insert source diskette in drive x
Insert target diskette in drive x

> **Explanation**: DISKCOPY.

> **Action**: Insert the appropriate diskette into the indicated drive, and press any key when prompted. The copying process starts.

Insert System disk in x
and strike any key when ready

> **Explanation**: SYS. SYS is trying to load the DOS files, but the indicated drive x does not contain the DOS Start-Up Diskette or the DOS Start-Up/Operating Diskette.

> **Action**: Follow the prompt and insert the DOS Start-Up Diskette or the DOS Start-Up/Operating Diskette. Press any key and processing continues.

Insert target diskette in drive B:
Strike any key when ready

> **Explanation**: SELECT. Informational prompt for single drive systems.

Action: Insert the target diskette into the drive and strike any key.

Insufficient disk space

Explanation: DOS and COMMANDS. The disk does not contain enough free space to contain the file being written.

Action: If you suspect this condition is invalid, run CHKDSK to determine the status of the disk. Otherwise, use another disk and retry the command.

Insufficient memory

Explanation: COMMANDS. The amount of available memory is too small to allow these commands to function.

Action: Change the BUFFERS= parameter in the CONFIG.SYS file to a smaller value. Restart the system and try the command again. If the message still appears, your system does not have enough memory to execute the command.

Insufficient memory for system transfer

Explanation: FORMAT and SYS. There is not enough memory on the disk.

Action: No action required.

Insufficient room in root directory
Erase files from root and repeat CHKDSK.

Explanation: CHKDSK. You instructed CHKDSK to create files from the "lost" data blocks it has found, but the root directory is full, and all of the lost chains could not be recovered into files.

Action:

1. Copy some of the recovered files to another disk for further examination.

2. Delete the recovered files from the disk you are checking.

3. Run CHKDSK again to recover the remainder of the lost data.

Insufficient space on disk

Explanation: DEBUG. A write command was issued to a disk that doesn't have enough free space to hold the data being written.

Action: If you are writing to a diskette, you can insert a diskette that has enough free space, then reissue the write command. Otherwise, you should erase files from the disk and run DEBUG again.

Insufficient stack space

Explanation: LINK. There is not enough memory to run the linker.

Action: Restart the system to free some memory that was used by installable device drivers such as VDISK, and terminate and stay resident programs such as PRINT and GRAPHICS.

Intermediate file error during pipe

Explanation: DOS. DOS is unable to create one or both of its intermediate files because the default drive's root directory was full, or DOS is unable to locate the piping files, or the disk does not have enough space to hold the data being piped.

Action: Erase some files from the default drive's root directory, and reissue the command that failed. If you get the same message, one of the programs in the command line has erased one or both of the piping files. Correct the program and reissue the command line.

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Internal stack overflow
System halted

> **Explanation**: DOS. The available stack resources were exceeded. This is caused by a rapid succession of recursive hardware interrupts.

> **Action**: Increase the stack resources by adding a STACKS command to the CONFIG.SYS file. See Chapter 4 for details on the STACKS command.

Invalid baud rate specified

> **Explanation**: MODE.

> **Action**: Specify the baud rate as 110, 150, 300, 600, 1200, 2400, 4800, 9600, or 19200 (you need specify only the first two characters of the number).

Invalid characters in volume label

> **Explanation**: FORMAT. One or more of the characters you entered in the volume label is not a valid file name character, or the name contained a period (volume labels contain 1 to 11 valid characters without a period).

> **Action**: Retry using valid characters.

Invalid code page specified

> **Explanation**: KEYB. The code page specified on the command line may not be used with the requested language.

> **Action**: Correct and retry the operation.

Invalid COMMAND.COM in drive n

> **Explanation**: DOS. When DOS tried to reload the command processor, the copy of COMMAND.COM on the disk was found to be an incorrect version.

Action: Insert the correct DOS diskette and press any key to continue.

Invalid country code or code page

Explanation: COUNTRY. The country code or code page specified in the COUNTRY= command in the CONFIG.SYS file is invalid or the requested code page is not available for the specified country code.

Action: See Appendix B for the correct country code and code page.

Invalid country code

Explanation: SELECT. The 3-digit country code identifying the country-dependent information is not found in the COUNTRY.SYS file.

Action: When using the SELECT command, use the proper number to identify the desired set of country-dependent information. It may be that the COUNTRY.SYS file was altered prior to the execution of SELECT.

Invalid current directory

Explanation: CHKDSK. CHKDSK attempted to read the current directory and found an unrecoverable error on the disk.

Action: No action required.

Invalid date

Explanation: DOS and COMMANDS. You entered an invalid date or delimiter. The only valid delimiters in a date entry are hyphens (-) and slashes (/).

Action: Re-enter a valid date.

Invalid device

Explanation: CTTY. DOS does not recognize the device name specified.

Action: Retry the command using a valid device name.

Invalid device parameters from device driver

Explanation: FORMAT. The number of hidden sectors (relative sectors) is not an exact multiple of the number of sectors per track. The DOS partition does not start on a track boundary.

Action: Load FDISK and set up a new DOS partition on the fixed disk. Retry FORMAT.

Invalid directory

Explanation: DOS and COMMANDS. One of the directories in the specified path does not exist.

Action: Retry the command using a valid directory.

Invalid disk change

Explanation: The diskette in the drive was changed while files were still open on the diskette.

Action: Reinsert the correct diskette.

Invalid drive in search path

Explanation: DOS. An invalid drive specifier was found in one of the paths specified in the PATH command. This message appears when DOS attempts to locate a command or batch file rather than at the time the incorrect PATH command was issued.

Action:

1. Enter PATH. This displays the paths previously defined.

2. Find the invalid specifier.

3. Re-enter the PATH command with the valid drive specifier and the desired paths.

Invalid drive or file name

Explanation: DOS and COMMANDS. The drive or file name specified is invalid.

Action: No action required.

Invalid drive specification

Explanation: COMMANDS. An invalid or non-existent drive specification was just entered in the command or in one of its parameters, or the source and target drive are the same.

Action: Re-enter the command using a valid drive specifier.

Invalid drive specification
Source and Target drives are the same

Explanation: BACKUP and RESTORE. You cannot have the same drive specifiers for the source and target drives.

Action: Specify a different drive letter for the source and target drives.

Invalid drive specification
Specified drive does not exist,
or is non-removable

Explanation: DOS and COMMANDS. An invalid drive specification was just entered in a command or in one of its parameters.

Action: Re-enter the command using a valid drive specifier.

Invalid environment size specified

Explanation: This message is issued when:

• The specified environment size contains non-numeric characters.

• The specified environment size is out of range.

Action: Enter the correct parameters within the specified range and retry the operation. See the SHELL command in Chapter 4 for additional information on setting the environment size.

Invalid file name or file not found

Explanation: RENAME or TYPE. You tried to rename a file that was either invalid or not found in the specified directory. TYPE does not allow global file name characters.

Action: No action required.

Invalid format file

Explanation: LINK. A library is in error.

Action: Restore library file from your backup disk and try again.

Invalid keyboard code

Explanation: SELECT. The 2-character code identifying the type of keyboard to be used was not found in the KEYBOARD.SYS file. It may be that the KEYBOARD.SYS file was altered prior to the execution of SELECT.

Action: When using the SELECT command, use the proper two-character code to identify the desired type of keyboard.

Invalid keyboard code specified

Explanation: KEYB. The keyboard code specified on the command line is not valid.

Action: Correct and retry the operation.

Invalid language specified

Explanation: KEYB. The language code specified on the command line is not valid.

Action: Correct and retry the operation.

Invalid media or track 0 bad - disk unusable

Explanation: FORMAT. FORMAT was unable to format track 0 on the specified media. This error occurs if:

- Track 0 is unusable. Track 0 is where the boot record, file allocation table, and directory must reside. If track 0 is bad, the disk is unusable.

- The diskette type and drive type are incompatible. You tried to format a double-sided, 320/360KB diskette in a high-capacity, 1.2MB drive; or a high-capacity, 1.2MB diskette in a double-sided, 320/360KB drive.

Action: For the first case, obtain another disk and retry the FORMAT command. For the second case, retry the FORMAT command specifying the /4 parameter.

Invalid number of parameters

Explanation: COMMANDS. You have specified too few or too many parameters for the command you issued.

Action: Review the command in Chapter 7, "DOS Commands."

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Invalid numeric parameter

Explanation: LINK. The numeric value is not in digits.

Action: Run LINK again and name the numeric parameter with values of 0 through 9 for each digit.

Invalid numeric switch specification
switch error: "s: *xxx*"

Explanation: LINK. You made an error entering a value for one of the LINKER switches, such as a character string for a switch that requires a numeric value.

Action: No action required. The linker will abort.

Invalid object module

Explanation: LINK. The object module(s) was incorrectly formed or unobserved errors occurred during compilation. The disk may be bad.

Action: Recompile the module to either the same or a different disk.

Invalid parameter

Explanation: DOS and COMMANDS. One or more of the parameters entered for these commands are not valid or have been placed in the wrong order.

Action: If the program expects a drive specifier, enter a colon (:) following the drive letter. In other cases, make sure the character following the slash (/) is valid for the program being run. For JOIN and SUBST, see the specific command description in Chapter 7 for valid parameters.

Invalid parameters

Explanation: Parameters are unrecognizable or are in the wrong order.

- The first parameter was other than **40**, **80**, **BW40**, **BW80**, **CO40**, **CO80**, **MONO**, **L**, or **R**.

- The adapter that the parameter refers to is not present in the machine.

Action: Check the preceding list and correct the command.

Invalid partition table

Explanation: Start-up. While attempting to start DOS from your fixed disk, the start-up procedures detected invalid information in the disk's partition information.

Action: Do the following:

1. Start DOS from the diskette.

2. Use the FDISK command to examine and correct the fixed disk partition information.

Invalid path

Explanation: COMMANDS. The path contained invalid characters or an invalid path name. Path greater than 63 characters.

Action: Check for invalid file name characters and format.

Invalid path, not directory
or directory not empty

Explanation: RMDIR.

- The specified directory was not removed because one of the names you specified in the path was not a valid directory name.

- The directory you specified still contains entries for files or other subdirectories (with the exception of the . and .. entries).

- You cannot remove a current directory.

Action: Try one of the following:

- Correct the invalid directory name in the path.
- Delete any files or remove any subdirectories in the directory.
- Change to a different subdirectory and try again.

Invalid path or file name

Explanation: ATTRIB or COPY. You specified a directory or file name that does not exist.

Action: Use the correct name. Retry the command after checking for the following:

- Correct spelling of names
- Valid directory names
- Existence of file in the subdirectory specified

Invalid path or parameter

Explanation: APPEND. A path and /X, /E or both were specified on the same APPEND command. /X and /E can only be specified alone and only the first time APPEND is invoked.

Action: If you want /X or /E, or both, you must specify them the first time APPEND is invoked and specify the path the second time you invoke APPEND.

Invalid signature in COUNTRY.SYS file

Explanation: SELECT. When trying to access the COUNTRY.SYS file in order to verify the 3-character country code, the file named COUNTRY.SYS did not contain the proper header. If the specified country code is not verified, then the SELECT operation will abort. The COUNTRY.SYS file may have been altered prior to execution of SELECT, or some other file may have been accidentally copied over the original COUNTRY.SYS file.

Action: Use the original DOS Start-Up Diskette or DOS Start-Up/Operating Diskette and repeat SELECT. If this file is inaccessible, then SELECT cannot function, and the KEYB.COM utility will fail, allowing the keyboard to be used only in US mode.

Invalid signature in KEYBOARD.SYS file

Explanation: SELECT. When trying to access the KEYBOARD.SYS file in order to verify the 2-character keyboard code, the file named KEYBOARD.SYS did not contain the proper header. If the specified keyboard code is not verified, then the SELECT operation aborts. The KEYBOARD.SYS file may have been altered prior to execution of SELECT, or some other file may have been accidentally copied over the original KEYBOARD.SYS file.

Action: Use the original DOS Start-Up Diskette or DOS Start-Up/Operating Diskette and repeat SELECT. If this file is inaccessible, then SELECT cannot function, and the KEYB.COM utility will fail, allowing the keyboard to be used only in US mode.

Invalid STACK parameter

Explanation: STACKS= command in CONFIG.SYS. Invalid combination of either the number of stacks or the stack size specified.

Action: Correct the STACKS= command in CONFIG.SYS and restart.

Invalid subdirectory

Explanation: CHKDSK. Invalid information was detected in the subdirectory whose name precedes this message.

Action: CHKDSK attempts to correct the error if you have used the /F parameter. For more specific information about the nature of the error, run CHKDSK with the /V parameter.

Invalid switch character

Explanation: VDISK. VDISK encountered a forward slash in the DEVICE = VDISK.SYS CONFIG.SYS command, but the following character was not an E. VDISK will attempt to install the virtual disk in low memory.

Action: No action required.

Invalid syntax

Explanation: KEYB. Parameters on the command line are not formatted correctly. Refer to Chapter 7 for the KEYB command format.

Action: Correct and retry the operation.

Invalid syntax on DISPLAY.SYS code page driver

Explanation: DISPLAY.SYS. The syntax of the DEVICE = DISPLAY.SYS command in the CONFIG.SYS file is incorrect.

Action: Assure that the parameters are correct, edit the CONFIG.SYS file and restart DOS.

Invalid syntax on PRINTER.SYS code page driver

Explanation: PRINTER.SYS. The syntax of the DEVICE = PRINTER.SYS command in the CONFIG.SYS file is incorrect.

Action: Assure that the parameters are correct, edit the CONFIG.SYS file, and restart DOS.

Invalid syntax on PRINTER.SYS code page switching device drivers

Explanation: MODE. The parameters of the DEVICE command on the PRINTER.SYS are invalid in the CONFIG.SYS file.

Action: Correct the parameters of the DEVICE command, and try again.

Invalid time

Explanation: TIME. An invalid time or delimiter was entered.

Action: Re-enter the correct time. The only valid delimiters are:

- colon (:) between the hours and minutes
- colon (:) between the minutes and seconds
- period (.) between the seconds and hundredths of a second.

Invalid Volume Label

Explanation: FORMAT. The volume label entered does not match the volume label on the disk to be formatted.

Action: Issue the VOL command to determine the correct volume label and try again.

K

KEYB has not been installed

Explanation: KEYB. The KEYB query function was requested before installing KEYB.

Action: Install KEYB. Refer to Chapter 7 for the KEYB command.

L

Label not found

Explanation: Batch file. Informational message. A GOTO command named a label that does not exist in the batch file. This caused the system to read to the end of the batch file, ending batch processing.

Action: If you do not want the GOTO to exit the batch file, edit the batch file and put the label in the desired location.

Last backup diskette not inserted

Explanation: BACKUP. The /A parameter was specified, but the removable target was not the last in the backup sequence.

Action: No action required.

*** Last file not backed up ***

Explanation: BACKUP. The fixed target filled to capacity while the file was being backed up. There is no room for the entire file, or there was a sharing error on a particular file.

Action: No action required.

Line too long

Explanation: EDLIN. Upon replacing a string, the replacement caused the line to expand beyond the 253-character limit. The REPLACE text command is ended abnormally.

Action: Split the long line into shorter lines; then issue the REPLACE text command again.

List output is not assigned to a device

Explanation: PRINT. The list device specified is not a valid device to PRINT to.

Action: Enter PRINT again and specify a valid list device.

Lock violation

Explanation: XCOPY. A source file has part or all of it locked against reading.

Action: Wait a short time and try again.

Logging to file *x*

> **Explanation**: BACKUP. You specified the /L option. Information message indicating the file where the backup log is being placed.

> **Action**: None.

**Logical DOS drive created, drive letters
changed or added**

> **Explanation**: Status message. A logical DOS drive has been created in the extended DOS partition on the fixed disk, and a drive letter of the specified size has been assigned on the fixed disk. DOS assigns drive letters in the order that logical drives reside in the extended DOS partition. A newly created drive may be either added to the end of the drive letter list, or it may cause some or all of the logical drives in the extended DOS partition to be assigned new drive letters.

> **Action**: You must format the created drive letter using the FORMAT command before using the logical drive.

LPT#: not rerouted.

> **Explanation**: MODE. Informational message. The parallel printer will now receive its own output, even if this printer's output had previously been rerouted to a serial device.

> This message is provided for your information and indicates cancellation of any previous redirection that may have been in effect because you set the printer width or vertical spacing.

> **Action**: No action required.

LPT#: rerouted to COM*n***:**

> **Explanation**: MODE. Informational message.

This message is provided for your information and indicates that any request that would normally have gone to the parallel printer LPT# (#= 1, 2, or 3) is sent instead to the serial device COM*n* (*n*= 1, 2, 3 or 4).

Action: No action required.

LPT#: set for 80

Explanation: MODE. Informational message. You set the printer line length to 80 characters by requesting standard type format.

This message is provided for your information. If the attempt was unsuccessful, an error message will follow this message on the screen.

Action: No action required.

LPT#: set for 132

Explanation: MODE. Informational message. You tried to set the printer line length to 132 characters by requesting compressed type format.

If the attempt is unsuccessful, an error message will follow this message on the screen.

Action: No action required.

M

Make sure a diskette is inserted into the drive and the door is closed

Explanation: DISKCOMP and DISKCOPY. The drive is empty or the drive door is left open.

Action: Insert a diskette or close the drive door.

Maximum available space for partition is *xxxx*
cylinders

> **Explanation**: FDISK. Informational message. The
> "Create DOS Partition" option displays the largest
> available space on the current fixed disk. These numbers
> are also used as the defaults for the two prompts that will
> follow.
>
> **Action**: No action required.

Maximum number of logical DOS drives
installed

> **Explanation**: DOS will support only drive letters A
> through Z. You have created the maximum number of
> logical drives (24).
>
> **Action**: If you need to define a new logical drive, you
> must first delete an existing logical drive in order to free a
> drive letter.

Memory allocation error
Cannot load COMMAND, system halted

> **Explanation**: DOS. A program destroyed the area in
> which DOS keeps track of available memory.
>
> **Action**: Restart DOS.

Mismatch DOS level number

> **Explanation**: LINK. Internal linker error.
>
> **Action**: Record the scenario that produced this message,
> and contact your IBM dealer.

Missing from the file is either the device ID
or the code page

> **Explanation**: MODE. The code page specified in the
> *cplist* is not supported in the .CPI file, or the .CPI file
> does not support the type of printer attached to the

LPT#. For the IBM Quietwriter III Printer Model 5202, a hardware code page (*hwcp*) in the DEVICE command can generate this error message, if the value of *hwcp* is not defined in the font file. The failure of preparing code pages can cause the existing code pages that are to be replaced by the code pages in the *cplist* to be undefined. There may exist a *cplist* code page duplication, and the code page preparation may not be accepted.

Action: Enter the correct code page for the *cplist*, or match the correct .CPI file for the printer type attached to the LPT#; or the code pages need to be prepared again.

Missing operating system

Explanation: Startup. When you tried to start DOS from a fixed disk, the startup procedures determined that the DOS partition was marked "bootable" (startable), but that the disk doesn't contain a copy of DOS.

Action: Start DOS from a diskette and use FORMAT with the /S parameter to place a copy of DOS on the fixed disk. You should back up your files before doing the FORMAT or they will be lost.

MODE *fff* Code page function completed

Explanation: MODE.
Where:
fff = one of the following:

Query, Prepare, Select

The final message from MODE indicating the end of its action regarding the indicated function.

Action: No action. Information only.

--More--

Explanation: MORE. The screen is full and there is more data waiting to be displayed.

A-86

Action: Press any character to see the next full screen.

Must specify COM1, COM2, COM3 or COM4

Explanation: MODE. You incorrectly entered MODE option 4.

Action: Try again.

Must specify destination line number

Explanation: EDLIN. A Move or Copy command was entered without a destination line number.

Action: Re-enter the command with a valid destination line number.

Must specify ON or OFF

Explanation: BREAK. You entered something other than on or off.

Action: Try again, specifying on or off.

N

Name of list device [PRN]:

Explanation: PRINT. This message appears the first time you start print after DOS has been restarted.

Action: Reply with the reserved device name which is to receive the printed output, or simply press Enter if the first parallel printer [PRN] is to be used.

NEAR/FAR conflict

Explanation: LINK. Conflicting near and far definitions for a communal variable.

Action: Revise definitions to be consistent.

NLSFUNC already installed

Explanation: NLSFUNC. Resident portion of NLSFUNC has already been loaded, and it can only be loaded once.

Action: None.

No Append

Explanation: APPEND. No directories are currently being searched by APPEND requests. APPEND was previously invoked with only ";" as the append path.

Action: No action required

No code page has been Selected

Explanation: In the MODE STATUS code page operation, the device reports that no code page is selected for that device.

Action: No action required. If desired, use MODE to SELECT a code page from the list of prepared code pages that immediately follow this message.

No Extended DOS partition to delete

Explanation: FDISK. You asked FDISK to delete the extended DOS partition from the fixed disk, but the partition does not exist.

Action: Use option 4 (display partition information) on the main FDISK menu to display what partitions exist on the fixed disk.

No files added

Explanation: REPLACE. The /A parameter was specified but all the files on the source already exist in the target directory.

Action: None.

A-88

No files found

Explanation: REPLACE. No files described by the source path and file name were found on the target.

Action: None.

No files replaced

Explanation: REPLACE. All files found on the target were not replaced because you answered "N" to all "REPLACE <filename>" prompts.

Action: None.

No fixed disks present

Explanation: FDISK. The FDISK program was run on an IBM Personal Computer that

- does not have a fixed disk, or

- has a fixed disk in the expansion unit and the expansion unit is not powered on, or

- has a fixed disk that is not properly installed.

Action: From the above list, determine what caused the problem and take appropriate action. Make sure the expansion unit is powered ON first.

No free file handles
Cannot start COMMAND, exiting

Explanation: DOS. An attempt to load a second copy of the command processor failed because there are too many files open.

Action: Increase the number in the FILES= command in the configuration file (CONFIG.SYS) and restart DOS.

No logical drives defined

Explanation: FDISK. There are no logical DOS drives defined in the extended DOS partition.

Action: To use the space on the disk reserved for the extended DOS partition, you should create one or more logical DOS drives using FDISK, and then format the created drive letters using the FORMAT command.

No object modules specified

Explanation: LINK. You did not name any object modules in the command line or in response to the prompt.

Action: Name the object modules, since the linker needs some files to link.

No partitions defined

Explanation: FDISK. There are no partitions defined on the fixed disk at the time.

Action: If you wish to use the fixed disk for a DOS disk, you must create a primary DOS partition using FDISK, and then format the created drive letter using the FORMAT command.

No partitions to delete

Explanation: FDISK. There are no DOS partitions defined.

Action: Use option 4 (display partition information) on the main FDISK menu to display what partitions exist on the fixed disk.

No partitions to make active

Explanation: FDISK. You chose the "Change Active Partition" option, but there were no partitions on the current fixed disk to be made active.

Action: Use the "Create DOS Partition" option to create a partition, then the "Change Active Partition" option to make it the active partition.

No path

Explanation: PATH. Informational message. An alternate path for DOS to search for commands and batch files is not specified.

Action: Informational message unless you want to define a set of paths. If so, enter PATH and the set of paths you want. Then press Enter.

No Primary DOS partition to delete

Explanation: FDISK. You asked FDISK to delete the primary DOS partition from the fixed disk, but the partition does not exist.

Action: Use option 4 (display partition information) on the main FDISK menu to display what partitions exist on the fixed disk.

No retry on parallel printer time-out

Explanation: MODE. P was not specified in Option 1, requesting no retry on time-out errors.

Action: No action required.

No room for system on destination disk

Explanation: SYS. The destination diskette does not contain the required reserved space for DOS; therefore, the system cannot be transferred.

Action: Format a blank diskette (use the FORMAT /S command), then copy any other files to the new diskette.

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No room in directory for file

> **Explanation**: EDLIN. The directory on the specified disk is full. Your editing changes are lost.

> **Action**: Make sure that your disk has available directory entries and run EDLIN again.

No room in root directory

> **Explanation**: LABEL. An error occurred while creating the volume label, probably due to lack of room in the root directory for another entry.

> **Action**: If the length of the label is less than 11 characters, and you used only valid file name characters (no periods), then delete a file from the root directory to make room for another entry. Try LABEL again.

No source drive specified

> **Explanation**: BACKUP. You did not specify the source drive.

> **Action**: Try again, specifying both the source and target drives.

No space for a *xxxx* cylinder partition

> **Explanation**: FDISK. You entered a "Partition Cylinder Size" that is larger than the largest piece of free space on the disk.

> **Action**: Enter a smaller number.

No space to create a DOS partition

> **Explanation**: FDISK. You chose the "Create DOS Partition" option on the current fixed disk, which has no space to create a DOS partition.

Action: Remove or reduce the size of the existing partition. Then run FDISK again to create the DOS partition(s).

No space to create logical drive

Explanation: All of the space in the extended DOS partition has been assigned to logical DOS drives.

Action: If another logical drive is required, you must first use FDISK to delete an existing logical drive in order to free space in the extended DOS partition.

No subdirectories exist

Explanation: TREE. Informational message. The specified drive contains only a root directory. Therefore, there is no directory path to display.

Action: No action required.

No system on default drive

Explanation: SYS. The system files to be transferred were not found on the disk or the diskette in the default drive.

Action: Choose a disk or a diskette with the system files on it (the DOS Start-Up Diskette or the DOS Start-Up/Operating Diskette), and try again.

No target drive specified

Explanation: You did not specify the target drive.

Action: Try again, specifying both the source and target drives.

No version of Graphic Character Set Table is already loaded

Explanation: GRAFTABL. Status message indicating that GRAFTABL has not been used to load character tables since DOS was loaded.

Action: None

Non-DOS diskette

Explanation: CHKDSK and COMMANDS. The format of the diskette accessed was not recognized.

Action: Format the diskette using the FORMAT command.

Non—Standard version of Graphic Character Set Table is already loaded

Explanation: GRAFTABL. Status message indicating that GRAFTABL was previously used to load a character table but, after that table was loaded, the table was modified. Therefore, this table cannot be identified. If a new table is loaded by GRAFTABL, it overlays the altered table already in place with no further loss of user RAM space.

Action: None.

Non-System disk or disk error
Replace and strike any key when ready

Explanation: Startup. No entry exists for IBMBIO.COM or IBMDOS.COM in the directory; or a disk read error occurred when you started up the system.

Action: Insert a DOS diskette in drive A and then restart your system.

*** Not able to back up file ***

Explanation: BACKUP. The files cannot be backed up due to a file sharing conflict.

Action: Retry the request at a later time by specifying the same backup command but include the /M parameter.

*** Not able to restore file ***

> **Explanation**: RESTORE. The file you want to restore cannot be opened due to a sharing conflict.

> **Action**: No action required.

Not enough memory

> **Explanation**: SHARE, REDIR. The available memory is less than what SHARE and REDIR need to start. They terminate without installation.

> **Action**: No action required.

Not enough room to merge the entire file

> **Explanation**: EDLIN. Informational message. A Transfer command was unable to merge the entire contents of the specified file because of insufficient memory. Only part of the file was merged.

> **Action**: Either reduce size of one of the files being merged, or install more memory.

Not found

> **Explanation**: EDLIN. Informational message. EDLIN could not find the string specified by the REPLACE text or SEARCH text commands within the specified range of lines. Or, if a search is resumed by replying **N** to the **OK?** prompt, no further occurrences of the string were found.

> **Action**: Check to be sure you properly used uppercase and lowercase letters for the string to be searched.

O

One or more CON code pages invalid for given language

> **Explanation**: KEYB. The KEYB command creates translation tables for each code page prepared at the time KEYB is issued. If any of the code pages are invalid for

the given language, the translation table will not be created.

Action: Warning message only. The keyboard will be loaded, but only the valid code pages are available for the keyboard.

Only non-bootable partitions exist

Explanation: FDISK. You asked FDISK to change the active partition, but none of the defined partitions can successfully boot from the fixed disk.

Action: Create a bootable partition, such as the primary DOS partition.

Only partitions on Drive 1 can be made active

Explanation: FDISK. The system can only boot from the first fixed disk, so there is no reason to mark a partition on drive 2 as active.

Action: Use FDISK to mark a partition on disk 1 as active in order to boot from the fixed disk.

Out of environment space

Explanation: DOS. Informational message. DOS was unable to accept the SET command you just issued because it was unable to expand the area in which the environment information is kept. This normally occurs when you try to add to the environment after loading a program which makes itself resident (PRINT, MODE, or GRAPHICS for example).

Action: See the SHELL command in Chapter 4.

Out of space on list file

Explanation: LINK. There is not enough disk space for the list file.

Action: Use a disk with enough free space to hold the file.

Out of space on run file

Explanation: LINK. This error usually occurs when there is not enough disk space for the run file (.EXE).

Action: Use a disk with enough free space to hold the file.

Out of space on scratch file

Explanation: LINK. The disk that the linker is using for the scratch file is full.

Action: Delete some files on that disk, or replace it with another diskette, and restart the linker.

Out of space on VM.TMP

Explanation: LINK. No more disk space remains to expand the VM.TMP file.

Action: Use a disk with enough free space to hold this file.

P

Parameters not compatible

Explanation: COMMANDS. You attempted to use two parameters that are not compatible with each other (/**B** and /**V** for example), the parameters specified do not apply to the drive or media involved.

Action: Review the FORMAT command. Correct the parameters and re-enter the command.

Parameter not compatible with fixed disk

Explanation: FORMAT. You incorrectly specified the /**1** or /**8** parameter while formatting a fixed disk. Neither of these parameters is valid for a fixed disk.

Action: Review the FORMAT command. Correct parameter and re-enter the command.

Parity error or nonexistent memory error detected

    Explanation: DEBUG.

    Action: No action required.

**Partition selected (#) is not bootable,
active partition not changed**

    Explanation: FDISK. The partition that you selected to be marked active is not a bootable partition. The active partition was not changed.

    Action: Select another partition to be marked active.

Partition 1 is already active

    Explanation: FDISK. Informational message. Partition 1 is the only partition defined and it is already marked as active.

    Action: No action required.

Partition *xx* made active

    Explanation: FDISK. Informational message. Partition *xx* is now marked as bootable.

    Action: No action required.

Path not found

    Explanation: DOS and COMMANDS. A file or path named in a command or command parameter does not exist in the directory of the specified (or default) drive.

    Action: Retry the command using the correct path and file name.

Path too long

> **Explanation**: COMMANDS. The path specified as a parameter was greater than 63 characters.

> **Action**: Correct the path and try again.

Pathname too long

> **Explanation**: PRINT. The path for the file you specified is longer than 63 characters.

> **Action**: No action required.

Please replace original diskette
in drive A: and press < ENTER >

> **Explanation**: LINK. This message appears after the .EXE file has been written if the /P switch is given.

> **Action**: Insert the diskette with the list file so that it can be reopened.

Press any key to begin adding files

> **Explanation**: REPLACE. The /W parameter was specified with the /A parameter and REPLACE is waiting for you to set up diskettes, before beginning.

> **Action**: Press a key when you are ready for REPLACE to begin.

Press any key to begin copying file(s)

> **Explanation**: XCOPY. Pause to allow you to change diskettes before copying begins.

> **Action**: Change diskettes as needed and press any key.

Press any key to begin recovery
of the file(s) on drive x

> **Explanation**: RECOVER.

Action: Insert the diskette to be recovered in the indicated drive and press any character key.

Press any key to begin replacing file(s)

Explanation: REPLACE. Pause to allow you to change diskettes before replacing begins.

Action: Change diskettes as needed and press any key.

Previously prepared code page replaced

Explanation: PREPARE. Because the space reserved for a new font definition is already filled, a previously defined code page is replaced by the new specified code page. This is not necessarily an error, since the replacement may have been intentional.

Action: Use the MODE code page status function to obtain the current list of code pages currently defined for the device. Use another PREPARE function of MODE to alter the list if not correctly defined.

Primary DOS partition already exists

Explanation: FDISK. Only one primary DOS partition can exist on the fixed disk.

Action: Use option 4 (display partition information) on the main FDISK menu to display what partitions exist on the fixed disk.

Primary DOS partition created

Explanation: Status message. The primary DOS partition has been created on the fixed disk, and a drive letter was assigned to the partition.

Action: The drive letter assigned when the partition was created must be formatted using the FORMAT command before it can be used.

Primary DOS partition deleted

Explanation: Status message. The primary DOS partition and its contents have been deleted from the fixed disk.

Action: No action required.

Print queue is empty

Explanation: PRINT. Informational message. There are currently no files being processed by PRINT.

Action: No action required.

Print queue is full

Explanation: PRINT. You tried to add more than the limit of ten files to the print queue. Ten files is the default. You can set the limit to 32 files. See the PRINT command.

Action: Wait until a file is printed before you add another file to the print queue.

Printer error

Explanation: MODE. The MODE command (option 1) was unable to set the printer mode because:

- An I/O error occurred.

- The printer is out of paper (or switch is off).

- The printer timed out (is not ready).

- The printer is offline.

Action: Determine which of above conditions caused the error message and correct.

Printer lines per inch set

Explanation: MODE. Informational message. You tried

to set the printer vertical spacing to the specified 6 or 8 lines per inch.

Action: If the attempt was unsuccessful, an error message follows this message on the screen.

Probable non-DOS disk
Continue (Y/N)?

> **Explanation**: CHKDSK. The file allocation table identification byte contains invalid information. Either the disk was not formatted by DOS or has become badly damaged.

> **Action**: If you did not use the /F parameter, and you reply **Y**, CHKDSK will indicate its possible corrective actions without actually changing the disk. We recommend doing this first, before you consider using the /F switch and replying **Y**.

Processing cannot continue

> **Explanation**: CHKDSK. Informational message. This message is followed by another message which explains why CHKDSK cannot continue.

> This message is normally issued when there is not enough memory.

> **Action**: No action required.

Program size exceeds capacity of LINK, limit 704K

> **Explanation**: LINK. Load module was too large for processing.

> **Action**: Reduce the size of the program.

Program terminated normally

> **Explanation**: DEBUG. This message informs you that the program that was executed by issuing G(o),T(race), or

P(roceed) has completed via an INT 20, INT 27, INT 21, or other expected manner.

Action: No action required.

Program too big to fit in memory

> **Explanation**: DOS. The file containing the external command cannot be loaded because it is larger than the available free memory.

> **Action**: Reduce the number in the BUFFERS= parameter in your CONFIG.SYS file (if you have specified BUFFERS=), restart your system, and reissue the command.

> If the message reappears, your system does not have enough memory to execute the command.

R

Read error, COUNTRY.SYS

> **Explanation**: SELECT. When reading the COUNTRY.SYS file while attempting to find the 3-digit country code, an I/O error occurred in accessing the file. Because this value cannot be verified, the SELECT operation is aborted.

> **Action**: Possible media problem, such as a damaged diskette. If you are using a copy of the master diskette, use the original DOS Start-Up Diskette or DOS Start-Up/Operating Diskette, and try again.

Read error, KEYBOARD.SYS

> **Explanation**: SELECT. When reading the KEYBOARD.SYS file while attempting to find the 2-character keyboard code, an I/O error occurred in accessing the file. Because the 2-letter code cannot be verified, the SELECT operation is aborted.

Action: Possible media problem, such as a damaged diskette. If you are using a copy of the master diskette, use the original DOS Start-Up Diskette or DOS Start-Up/Operating Diskette, and try again. If this file is inaccessible, then SELECT cannot function, and the KEYB.COM utility will fail, thus allowing the keyboard to be used only in US mode.

Read error in:
x:\level 1\level 2.

Explanation: EDLIN. An error occurred while reading file *x*:*xxxx**xxxx* into memory.

Action: Copy the file or a backup of the file to a different disk and try again.

Reinsert diskette for drive *x*
and strike Enter when ready

Explanation: FORMAT. This message, which usually occurs after you enter FORMAT /S, means:

• DOS filled the memory with system files, but could not read all of the files into memory because of insufficient memory size.

• After asking for the new diskette, FORMAT started formatting it and all of the files in memory on the new diskette.

• FORMAT then asked that the DOS diskette be inserted so it could finish loading the rest of the DOS files into memory.

Action: FORMAT is now asking you to insert the new diskette again so it can finish the task of writing the DOS files onto the new diskette.

REPLACE < d:path\filename > (Y/N)?

Explanation: REPLACE. The /P parameter was specified; you are prompted before each file is replaced.

Action: Enter a y or n to the prompt.

Replacing < d:path\filename >

> **Explanation**: Informational message indicating which file is currently being replaced.

> **Action**: None

**Requested logical drive size exceeds
the maximum available space**

> **Explanation**: The cylinder size entered for the logical drive is larger than the maximum available space in the extended DOS partition. FDISK displays the maximum available size for the partition as the default entry value.

> **Action**: Enter a value that is less than or equal to the default size displayed.

**Requested partition size exceeds the
maximum available space.**

> **Explanation**: The cylinder size entered for the partition size is larger than the maximum available space on the fixed disk. FDISK displays the maximum available size for the partition as the default entry value.

> **Action**: Enter a value that is less than or equal to the default size displayed.

Relocation table overflow

> **Explanation**: LINK. The program has more than 13,000 long calls, long jumps, or other long pointers.

> **Action**: Rewrite the program replacing long references with short references where possible and recreate the object module.

> **Note:** Pascal and FORTRAN users should first try turning off DEBUG.

MESSAGES

Resident part of PRINT installed

Explanation: PRINT. Informational message. The message appears the first time you use the PRINT command.

This message indicates that a program has been loaded into memory to handle subsequent PRINT commands. Available memory for your applications has been reduced by approximately 3200 bytes.

Action: No action required.

Resident portion of MODE loaded

Explanation: MODE. Informational message.

This message indicates that when MODE is entered for a non-screen-setting function, it is sometimes necessary to load a portion of code to be made permanently resident.

Resident portion of NLSFUNC loaded

Explanation: NLSFUNC. Support for code page switching and extended country information has been loaded.

Action: No action required.

Restore file sequence error

Explanation: RESTORE. The file was not restored because the diskettes were not inserted in sequential order.

Action: Retry the restore, inserting the diskettes in sequential order.

*** Restoring files from drive *xx* ***

Explanation: RESTORE. Informational message. This message is followed by a list of files that were restored from the indicated diskette.

Action: No action required.

*** Restoring files from drive *y* ***
Source: *x*

    Explanation: RESTORE. This is an informational message telling you that the files on the source drive are being restored.

    Action: No action required.

S

Same drive specified more than once

    Explanation: FASTOPEN. Same drive letter was specified more than once.

    Action: Re-enter the command, specifying each drive letter only once.

Sector size adjusted

    Explanation: VDISK. VDISK found it necessary to adjust the sector size value in the DEVICE = VDISK.SYS in the CONFIG.SYS command.

    Action: No action required.

Sector size too large in file < file name >

    Explanation: Startup. The device driver named in < file name > specifies a device sector size larger than the devices previously defined to DOS.

    Action: Reduce the sector size to conform with the sector size of DOS.

    If this is a purchased program, return it to your dealer.

Segment limit set too high, exceeds 1024

Explanation: LINK. The count specified for segments in the /X: parameter is too large.

Action: No action required. The linker will abort.

Segment limit too high

Explanation: LINK. Your system does not have enough memory for the linker to allocate tables to describe the number of segments requested (either the value specified with /X or the default value of 256 bytes).

Action: Either try the link again using /X to select a smaller number of segments (such as 128, if the default was used previously) or restart the system to free some memory that was used by installable device drivers such as VDISK, and terminate and stay resident programs such as PRINT and GRAPHICS.

Segment size exceeds 64K

Explanation: LINK. This message indicates that you attempted to combine identically named segments, which resulted in a segment requirement of greater than 64K bytes. You cannot address more than 64K bytes.

Action: Change segment names in object modules and try link again.

SHARE already installed

Explanation: SHARE. SHARE has already been loaded and can be loaded only once.

Action: None.

Sharing violation

Explanation: XCOPY. A file on the source or destination is currently open in a sharing mode that does not allow XCOPY to read or write to the file.

Action: Wait until the file is closed before attempting to access it.

Source diskette bad or incompatible

Explanation: DISKCOPY. The errors occurred while reading the diskette. The error may have been caused by bad sectors
 or the diskette in the source drive may not be compatible with the source drive type (a high-capacity diskette in a 320/360KB diskette drive for example).

Action: Check your diskette.

Source does not contain backup files

Explanation: RESTORE. The source media does not contain files created by the BACKUP command.

Action: No action required.

Source path required

Explanation: REPLACE. You must at least specify a source path.

Action: Specify a source path and try again.

Specified command search directory bad

Explanation: COMMANDS. An invalid path name was specified.

Action: Specify a valid path name containing the command to be executed by the secondary command processor.

Specified drive does not exist, or is non-removable

Explanation: DISKCOPY and DISKCOMP. The drive specifier is for a fixed disk drive, or does not exist on your computer.

Action: Check the drive-specifier and reenter the command.

Stack size exceeds 65536 bytes

Explanation: LINK. Informational message. The size specified for the stack can be no more than 65536 bytes.

Action: No action required.

Symbol defined more than once

Explanation: LINK. The Linker found two or more modules that define a single symbol name.

Action: Check for the following:

• Are you sure you're not linking the same files twice?

• Does one of the modules being linked have a symbol incorrectly identified as *public* instead of *external*?

Symbol table overflow

Explanation: LINK. Your program has greater than 256KB of symbolic information (public symbols, externals, segments, groups, classes, files).

Action: Combine modules and/or segments and recreate the object files. Eliminate as many public symbols as possible.

Syntax error

Explanation: DOS. The command format you typed is incorrect.

Action: Check to make sure you have used the correct format for this command.

System files restored
The target disk may not be bootable

> **Explanation**: RESTORE. The DOS system files
> IBMBIO.COM or IBMDOS.COM were restored. The
> diskette may not be bootable if the system files from a
> previous version of DOS were restored.
>
> **Action**: Transfer the SYS to the disk with DOS Version
> 3.30 and copy COMMAND.COM to the root directory
> of the target disk.

System transferred

> **Explanation**: FORMAT. This message is displayed when
> you specify FORMAT /S. It is an informational message
> telling you that the system files have been installed on the
> formatting disk.
>
> **Action**: No action required.

System will now restart
Insert DOS diskette in drive A:
Press any key when ready

> **Explanation**: FDISK. Informational message. FDISK
> requires the system to restart in order to update the
> partition information.
>
> **Action**: Insert either the DOS Start-Up Diskette or the
> DOS Start-Up/Operating Diskette in drive A, and press
> any key.

T

Target cannot be used for backup

> **Explanation**: BACKUP. Your attempt to create files on
> the target disk failed.
>
> **Action**: Replace the disk if it is removable. If not,
> BACKUP to a different device or restart the system and
> try again.

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Target diskette may be unusable

> **Explanation:** DISKCOPY. This message follows an unrecoverable read, write, or verify error message. The copy on the target diskette may be incomplete because of the unrecoverable I/O error.
>
> **Action:**
>
> - If an error is on the target diskette, get a fresh diskette for your target, and retry the DISKCOPY command.
>
> - If the error is on the source diskette, copy all files from the source diskette to another diskette. Then try to reformat the source diskette.

Target diskette unusable

> **Explanation:** DISKCOPY. Errors encountered during the copy indicate that the target diskette is dirty, damaged or of poor quality, or the drive is malfunctioning on some tracks.
>
> **Action:** Change the target drive or the diskette and try again.

Target diskette write protected
Correct, then strike any key

> **Explanation:** DISKCOPY. You are trying to produce a copy on a diskette that is write protected.
>
> **Action:** Either remove the write protect tab or use another diskette that is not write protected.

Target is full

> **Explanation:** RESTORE. The disk you are restoring to is full.

Action: Delete any unnecessary files on the diskette and try again. Or RESTORE to a destination disk with more space.

10 Mismatches - ending compare

Explanation: COMP. Information message. Ten mismatched locations were detected in the files being compared. COMP assumes that the files are so different that further comparisons would serve no purpose.

Action: No action required.

Terminate batch job (Y/N)?

Explanation: DOS. This message appears when you press Ctrl-Break while DOS is processing a batch file.

Action: Press Y to stop processing the batch file. Pressing N only ends the command that was executing when Ctrl-Break was pressed; processing resumes with the next command in the batch file.

Terminated by user

Explanation: LINK. The user entered Ctrl-Break in response to one of the linker prompts.

Action: No action required.

The current active keyboard table is *xx*
with code page: *yyy*
The current active CON code page is: *zzz*

Explanation: The KEYB query function was requested. *xx* is the active keyboard language and *yyy* is the active keyboard code page. *zzz* is the invoked CON code page.

Action: No action required.

The current active partition is *x*.

Explanation: FDISK. Informational message. The

"Change Active Partition" option displays the active partition on the current fixed disk.

Action: No action required.

The last file was not restored

Explanation: RESTORE. You stopped RESTORE before it completely restored the last file listed, or there was not enough room on the fixed disk and RESTORE deleted the partially restored file.

Action: If RESTORE has ended, you can re-enter the RESTORE command with the file name of the file(s) not restored to continue from the point where RESTORE stopped.

If the problem occurred because you ran out of room on the fixed disk, you must evaluate which files to keep and which ones to delete. Then continue the execution of RESTORE.

The only bootable partition on Drive 1 is already marked active.

Explanation: FDISK. Only one partition exists on drive 1, and it is already marked as active.

Action: No action required.

There was/were *xxx* errors detected

Explanation: LINK. This message is displayed for your information at the end of the link session.

Action: No action required.

Too many block devices

Explanation: CONFIG.SYS. You attempted to install more than the system limit of 26 block device units.

Action: Change the "DEVICE = " value in the CONFIG.SYS file so that only 26 block device units (including those automatically installed by DOS for disk drives). See Chapter 4, "Configuring Your System," of this book, and Chapter 2, "Installable Device Drivers," of the *DOS Technical Reference* for more information.

Too many drive entries

Explanation: FASTOPEN. Too many drive letters were specified.

Action: Re-enter the command with fewer drive letters.

Too many external symbols, limit 510 per module

Explanation: LINK. More than the limit of 510 external symbols were specified in a module.

Action: Break up the module.

Too many files open

Explanation: EDLIN. EDLIN tried to open the specified file, but was not able to.

Action: Increase the FILES = value in the CONFIG.SYS file.

Too many group-, segment-, and class-names, limit 254 per module

Explanation: LINK. Your program contains too many group, segment, and class names.

Action: Reduce the number of groups, classes and recreate segments, or class-names. Recreate the object files.

Too many groups

Explanation: LINK. The limit is 9, including DGROUP. This message indicates that the limit was exceeded.

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Action: Reduce the number of groups.

Too many GRPDEFs, limit 8 per module.

Explanation: LINK. The linker encountered more than 8 GRPDEFs in a single module.

Action: Reduce the number of groups or split the module.

Too many libraries, limit is 16

Explanation: LINK. You tried to open more than 16 libraries.

Action: Combine libraries or link modules that require fewer libraries.

Too many name entries

Explanation: FASTOPEN. The total number of entries requested for files and subdirectory names for all drives is greater than 999.

Action: Change the total number of name entries specified for all drives to less than 999, and try again.

Too many open files

Explanation: XCOPY. The system configuration is such that there are less then two file handles available.

Action: Increase the FILES = value in the CONFIG.SYS file if it is less than 20 now.

Too many overlays

Explanation: LINK. The limit is 63 overlays. This message indicates that the limit was exceeded.

Action: Reduce the number of overlays.

Too many public symbols

> **Explanation**: LINK. The limit is 2048 public symbols. This message indicates that the limit was exceeded.

> **Action**: Reduce the number of public symbols.

Too many segments, limit 255 per module

> **Explanation**: LINK. Your object module has more than 255 segments.

> **Action**: Split the modules or combine segments.

Too many segments, use /X:N (256 < N < 1025)

> **Explanation**: LINK. You specified more than the maximum of 1024 segments.

> **Action**: Relink using the /X parameter with the appropriate number of segments specified.

Too many TYPDEFs, limit 255 per module

> **Explanation**: LINK. TYPDEFs are records written by the compiler to describe communal variables.

> **Action**: Create two sources from the old source, dividing the communal variable definitions between them; recompile and relink.

Top level process aborted, cannot continue

> **Explanation:** During boot, COMMAND .COM or a command in general detected a disk error, and you chose to ABORT. The error is unrecoverable and COMMAND has no choice but to halt.

> **Action:** Use another disk.

Total disk space is *xxxx* cylinders.

Explanation: FDISK. Informational message. This message shows the total space on the current fixed disk.

Action: No action required.

Transfer size adjusted

Explanation: VDISK. The maximum number of sectors to transfer was not in the range 1-8. The value 8 used by VDISK.

Action: No action required.

Tree past this point not processed

Explanation: CHKDSK. Informational message. CHKDSK is unable to continue processing past the directory path currently being examined because of the error displayed in the previous message.

Action: No action required.

U

Unable to create directory

Explanation: DOS and COMMANDS. The directory you want to create

• Already exists

• One of the directory path names you specified could not be found.

• You attempted to add a directory to the root directory and it is full.

• A file by that name already exists in that directory.

• The directory name you specified contains invalid characters or is a reserved device name.

Action: Do the following:

- Check to see if a directory by that name exists in the parent directory (or current directory).

- Recheck all your directory names to make sure they are valid.

- Use CHKDSK to see if your directory is full.

Unable to create KEYB table in resident memory

Explanation: KEYB. The KEYB command was previously installed and allocated a specific amount of resident memory for the tables. The requested configuration exceeds that resident memory.

Action: Restart DOS and reinstall KEYB with a new configuration.

Unable to shift screen left

Explanation: MODE. Shifting the screen further to the left would exceed the allowable limit.

Action: No action required.

Unable to shift screen right

Explanation: MODE. Shifting the screen further to the right would exceed the allowable limit.

Action: No action required.

Unable to write BOOT

Explanation: FORMAT. The first track of the diskette or DOS partition is bad. The BOOT record could not be written on it. The diskette or DOS partition is not usable.

Action: Obtain another diskette and retry the FORMAT command.

MESSAGES

Unexpected end-of-file on library

    Explanation: LINK. Informational message. This is caused by an error in the library file.

    This usually means that the object file contains bytes that are of the same value as the end-of-file. If this occurs, LINK continues processing to the physical end-of-file as given in the directory.

    Action: No action required.

Unexpected end-of-file on scratch file

    Explanation: LINK. The diskette containing VM.TMP was removed.

    Action: Restart the linker.

Unexpected end of file on VM.TMP

    Explanation: LINK. Informational message. The diskette containing VM.TMP was removed.

    Action: No action required.

Unrecognized command in CONFIG.SYS

    Explanation: Startup. An invalid command was detected in the configuration file CONFIG.SYS.

    Action: Edit the file, correct the invalid command, and restart DOS.

Unrecognized switch error: *xxxxxx*

    Explanation: LINK. You entered an unrecognized character after the switch indicator /.

    Action: No action required. The linker will abort.

Unrecoverable error on directory

Explanation: CHKDSK. CHKDSK encountered an error while checking the directory.

Action: No action required.

Unrecoverable file sharing error

Explanation: COMMANDS. A file sharing conflict occurred. Files cannot be restored.

Action: No action required.

Unrecoverable read error on drive x
Track xx, side x

Explanation: DISKCOMP. Four attempts were made to read the data from the diskette in the specified drive. The data could not be read from the indicated track and side.

Action: If the error occurred on the target diskette (just created by DISKCOPY) get a fresh diskette and retry the DISKCOPY and DISKCOMP commands. Otherwise, copy all files from the damaged diskette to another diskette. Then reformat the bad diskette or else discard it.

Unrecoverable read error on source
Track xx, side x

Explanation: DISKCOPY. Four attempts were made to read the data from the source diskette. DISKCOPY continues copying, but the copy may contain incomplete data.

Action: Use the following form of the COPY command:

```
COPY *.*
```

to copy all files from the damaged diskette to another diskette. Reformat the bad diskette, or else discard it.

Unrecoverable write error on target
Track *xx*, **side** *x*

> **Explanation**: DISKCOPY. Several attempts were made to write the data to the target diskette. DISKCOPY continues copying, but the copy may contain incomplete data.
>
> **Action**: Obtain a fresh diskette and re-enter the DISKCOPY command. Use FORMAT on the bad diskette to see if can be reused. If it is a bad diskette, discard it.

Unresolved externals: list

> **Explanation**: LINK. The external symbols listed were not defined in the modules or library files that you specified.
>
> **Action**: Do not attempt to run the executable file created by the linker.
>
> Make sure you specified all appropriate object modules and libraries. Check the source code for the program that caused the message and make corrections to that program.

V

VDISK not installed - insufficient memory

> **Explanation**: VDISK. This message occurs if:
>
> - Less than 64KB of available memory would exist even after attempting to adjust the virtual disk size and number of directory entries.
>
> - You have specified the /E parameter, and the computer does not contain extended memory.
>
> - The amount of available extended memory is too small to install the virtual disk, even after adjusting the parameters.

Action: No action required.

VDISK Version 3.30 Virtual Disk x

Explanation: VDISK. This message is issued when VDISK receives control to install a virtual disk, and x tells you which drive letter is being assigned to the virtual disk.

Action: No action required.

VERIFY is on|off

Explanation: VERIFY. Informational message.

Action: No action required.

VM.TMP is an illegal file name and has been ignored

Explanation: LINK. Informational message VM.TMP cannot be used for an object file name.

Action: No action required.

Volume label (11 characters, ENTER for none) ?

Explanation: FORMAT. You are requested to enter a 1- to 11- character volume label that will be written on the disk being formatted.

Action: If you do not want a volume label on the disk, press only the Enter key.

Warning! All data on non-removable disk drive x
will be lost
Proceed with Format (Y/N)?

Explanation: FORMAT. Prompt telling you that the fixed disk will be formatted.

Action: If you do not want to format the fixed disk, type **n**. If you want to format the fixed disk, type **y**.

**Warning! Data in the extended DOS partition
could be DESTROYED. Do you wish to
continue....................? [n]**

>   **Explanation**: FDISK. The "delete extended DOS
>   partition" option is warning you that, if you continue, all
>   data in the DOS partition on the current fixed disk could
>   be destroyed.
>
>   **Action**: If you press Enter, the DOS partition will NOT
>   be destroyed. If you wish to delete the DOS partition,
>   type Y and press Enter.

**Warning! Data in the Primary DOS partition
could be DESTROYED. Do you wish to
continue....................? [n]**

>   **Explanation**: FDISK. The "delete primary DOS
>   partition" option is warning you that, if you continue, all
>   data in the DOS partition on the current fixed disk could
>   be destroyed.
>
>   **Action**: If you press Enter, the DOS partition will NOT
>   be destroyed. If you wish to delete the DOS partition,
>   type Y and press Enter.

Warning-directory full
***xxx* file(s) recovered**

>   **Explanation**: RECOVER. There is insufficient directory
>   space to recover more files.
>
>   **Action**: Copy some of the files to another disk, erase them
>   from this disk, and run RECOVER again.

**Warning! Diskette is out of sequence
Replace the diskette or continue
Strike any key when ready**

>   **Explanation**: RESTORE. The backup diskette is not the
>   next one in sequence.

Action: Replace the diskette unless you are sure no files on the diskette(s) you skipped would be restored. RESTORE will continue when you press a key. This message will be repeated if you try to skip a diskette that contains part of a file being restored.

Warning! File *xx*
is a read only file
Replace the file (Y/N)?

> **Explanation**: RESTORE. The indicated file is read-only.

> **Action**: Enter **Y** if you want to replace it or **N** if you do not. RESTORE will continue after you press ENTER. You will see this message only if you specified the **/P** option.

Warning! File *xx*
was changed after it was backed up
Replace the file (Y/N)?

> **Explanation**: RESTORE. The indicated file on the fixed disk has a later date and time than the corresponding file on the backup diskette.

> **Action**: Enter **Y** if you want to replace it with the backed up version or **N** if you do not. RESTORE will continue after you press ENTER. You will see this message only if you specified the **/P** option.

Warning! Files in the target drive
d:\BACKUP directory will be erased
Strike any key when ready

> **Explanation**: BACKUP. This is a warning that the files in the \BACKUP directory will be erased.

> **Action**: If you do not want to proceed, press Ctrl-Break. To continue, strike any key.

Warning! Files in the target drive
d:\root directory will be erased
Strike any key when ready

> **Explanation**: BACKUP. This is a warning prompt to tell you the files in the root directory will be erased.

> **Action**: If you do not want to proceed, press Ctrl-Break. To continue, strike any key.

Warning! No files were found to back up

> **Explanation**: BACKUP. Informational message telling you that no files were found to back up.

> **Action**: No action required.

Warning! No files were found to restore

> **Explanation**: RESTORE. No backup files were found that matched the restore file specification.

> **Action**: Make sure the criteria you specified for BACKUP is what you want. Otherwise, this is an informational message.

Warning: No stack segment

> **Explanation**: LINK. Informational message. None of the object modules specified contain a statement allocating stack space.

> **Action**: No action required.

Warning! Target is Full

> **Explanation**: RESTORE. The target device is full. No more files can be restored.

> **Action**: No action required.

Warning! The partition marked active is not bootable

> **Explanation**: An attempt to boot from the fixed disk will cause unpredictable results.

> **Action**: Use option 2 on the main FDISK menu (change active partition) to set the bootable, active partition.

Writing *xxx* bytes

> **Explanation**: DEBUG. Informational message telling how many bytes are being written.

> **Action**: No action required.

X

***xxxxxxxxxx* bytes disk space freed**

> **Explanation**: CHKDSK. Informational message. The disk space marked as allocated was not associated with a file. If you used the /F parameter, the space was freed and made available.

> **Action**: No action required.

***xxxxxxxx* code page driver cannot be initialized**

> **Explanation**: PRINTER.SYS or DISPLAY.SYS. Incorrect parameters specified in DEVICE = command in CONFIG.SYS.

> **Action**: Assure that the device or devices specified and other parameters are correct, edit the CONFIG.SYS file, and restart DOS.

***xxxxxxxx* device driver cannot be initialized**

> **Explanation**: DOS. The parameters defined in the DEVICE command for the device *xxxxxxxx* are invalid.

Action: Correct the parameters of the DEVICE command, and try again.

xxxx **error on file** *yyyy*

> **Explanation**: PRINT. This message appears on the printer. While attempting to read data from file *yyyy* for printing, a disk error of type *xxxx* was encountered. Printing of that file is stopped.
>
> **Action**: Check that the disk drive is ready.

xxx **files added**

> **Explanation**: REPLACE. Informational message indicating how many files on the target were added to the target subdirectory.
>
> **Action**: None.

x **is not a choice. Enter a choice.**

> **Explanation**: FDISK. You entered *x* which is not a choice for this question.
>
> **Action**: Enter a valid choice.

x **is not choice. Enter Y or N**

> **Explanation**: FDISK. You entered *x* which is not a choice for this question.
>
> **Action**: Enter Y or N.

x **is not a choice. Please enter y-z**

> **Explanation**: You did not enter a valid entry. The range of valid entries is shown in the message.
>
> **Action**: Enter a valid value.

xxxxxx is not a valid library

> **Explanation**: LINK. The file specified as a library is invalid.

> **Action**: No action required. The linker will abort.

xxx lost clusters found in yyy chains.
Convert lost chains to files (Y/N)?

> **Explanation**: CHKDSK. Ctrl-Break was entered during a disk I/O operation. CHKDSK did not clean up the disk after encountering the Ctrl-Break.

> **Action**: If you reply **Y** and you have used the /F parameter, CHKDSK will recover each chain into a separate file; otherwise, if you reply **N**, CHKDSK frees the blocks so they can be allocated to new files. If CHKDSK was specified (no /F), then messages displayed afterwards are informational (no corrective action was taken).

xxxxxx of xxxxxx bytes recovered

> **Explanation**: RECOVER. This is an informational message indicating the number of bytes of the specified file that were recovered.

> **Action**: No action required.

nnn version of Graphic Character Set Table is already loaded

> **Explanation**:GRAFTABL.
> Where:
> nnn = 437
> nnn = 860
> nnn = 865
> nnn = 863

> Status message indicating that GRAFTABL was previously used to load a code character table, and that table is still recognized as the specified table. If a new table is loaded by GRAFTABL, it overlays the standard

table already in place with no further loss of user RAM space.

Action: None.

nnn version of Graphic Character Set Table is now loaded

Explanation: GRAFTABL.
Where:
nnn = 437
nnn = 860
nnn = 865
nnn = 863

Status message indicating that loading of a character definition table was requested. The operand was the number of the code page to be loaded and the interrupt 1FH was changed to point to the location of the table.

If the status message preceding this message indicated that there was no code page table previously loaded, then the size of available user RAM space has been reduced by the size of this loaded table, plus the size of the interrupt handler.

If the status message preceding this message indicated that there was a code page table previously loaded, then the size of available user RAM space has not been changed. The new table is installed over the table previously loaded.

Action: None.

Appendix B. Country and Keyboard Codes

Country and Keyboard Codes

Select the country and keyboard codes for the SELECT command from the following table.

Country	Country Code	Keyboard Code
Arabic	785	
Australia	061	US
Belgium	032	BE
Canada (Eng.)	001	US
Canada (Fr.)	002	CF
Denmark	045	DK
Finland	358	SU
France	033	FR
Germany	049	GR
Hebrew	972	
Italy	039	IT
Latin America	003	LA
Netherlands	031	NL
Norway	047	NO
Portugal	351	PO
Spain	034	SP
Sweden	046	SV
Switzerland (Fr.)	041	SF
Switzerland (Ger.)	041	SG
United Kingdom	044	UK
United States	001	US

Appendix C. Code page Tables

Hex Digits 1st→ 2nd↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		►		0	@	P	`	p	Ç	É	á	░	└	╨	α	≡
-1	☺	◄	!	1	A	Q	a	q	ü	æ	í	▒	┴	╤	β	±
-2	☻	↕	"	2	B	R	b	r	é	Æ	ó	▓	┬	╥	Γ	≥
-3	♥	‼	#	3	C	S	c	s	â	ô	ú	│	├	╙	π	≤
-4	♦	¶	$	4	D	T	d	t	ä	ö	ñ	┤	─	╘	Σ	⌠
-5	♣	§	%	5	E	U	e	u	à	ò	Ñ	╡	┼	╒	σ	⌡
-6	♠	▬	&	6	F	V	f	v	å	û	ª	╢	╞	╓	µ	÷
-7	•	↨	'	7	G	W	g	w	ç	ù	º	╖	╟	╫	τ	≈
-8	◘	↑	(	8	H	X	h	x	ê	ÿ	¿	╕	╚	╪	Φ	°
-9	○	↓	)	9	I	Y	i	y	ë	Ö	⌐	╣	╔	┘	Θ	∙
-A	◙	→	*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Ω	·
-B	♂	←	+	;	K	[	k	{	ï	¢	½	╗	╦	█	δ	√
-C	♀	∟	,	<	L	\	l	|	î	£	¼	╝	╠	▄	∞	^{n}
-D	♪	↔	-	=	M	]	m	}	ì	¥	¡	╜	═	▌	φ	^{2}
-E	♫	▲	.	>	N	^	n	~	Ä	₧ Pt	«	╛	╬	▐	ε	■
-F	☼	▼	/	?	O	_	o	⌂	Å	ƒ	»	┐	╧	▀	∩	

Code page 850 (Multilingual)

Hex Digits 1st → 2nd ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		►		0	@	P	`	p	Ç	É	á	▓	└	ð	Ó	-
-1	☺	◄	!	1	A	Q	a	q	ü	æ	í	▒	┴	Ð	ß	±
-2	☻	↕	"	2	B	R	b	r	é	Æ	ó	▓	┬	Ê	Ô	=
-3	♥	‼	#	3	C	S	c	s	â	ô	ú	│	├	Ë	Ò	¾
-4	♦	¶	$	4	D	T	d	t	ä	ö	ñ	┤		È	õ	¶
-5	♣	§	%	5	E	U	e	u	à	ò	Ñ	Á	┼	ı	Õ	§
-6	♠	▬	&	6	F	V	f	v	å	û	ª	Â	ã	Í	µ	÷
-7	•	↨	'	7	G	W	g	w	ç	ù	º	À	Ã	Î	þ	¸
-8	◘	↑	(	8	H	X	h	x	ê	ÿ	¿	©	└	Ï	Þ	°
-9	○	↓	)	9	I	Y	i	y	ë	Ö	®	╣	┌	┘	Ú	¨
-A	◎	→	*	:	J	Z	j	z	è	Ü	¬	║	┴	┌	Û	·
-B	♂	←	+	;	K	[	k	{	ï	ø	½	╗	┬	■	Ù	¹
-C	♀	∟	,	<	L	\	l	|	î	£	¼	╝	├	▬	ý	³
-D	♪	↔	-	=	M	]	m	}	ì	Ø	¡	¢	=	│	Ý	²
-E	♫	▲	.	>	N	^	n	~	Ä	×	«	¥	┼	Ì	¯	■
-F	☼	▼	/	?	O	_	o	⌂	Å	ƒ	»	┐	¤	▬	´	▬

Hex Digits 1st→ 2nd↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		►		0	@	P	`	p	Ç	É	á	▓	└	╨	α	≡
-1	☺	◄	!	1	A	Q	a	q	ü	À	í	▒	┴	╤	β	±
-2	☻	↕	"	2	B	R	b	r	é	È	ó	▓	┬	╥	Γ	≥
-3	♥	‼	#	3	C	S	c	s	â	ô	ú	│	├	╙	π	≤
-4	♦	¶	$	4	D	T	d	t	ã	õ	ñ	┤	─	╘	Σ	⌠
-5	♣	§	%	5	E	U	e	u	à	ò	Ñ	╡	┼	╒	σ	⌡
-6	♠	▬	&	6	F	V	f	v	Á	Ú	ª	╢	╞	╓	μ	÷
-7	●	↨	'	7	G	W	g	w	ç	ù	º	╖	╟	╫	τ	≈
-8	◘	↑	(	8	H	X	h	x	ê	Ì	¿	╕	╚	╪	Φ	°
-9	○	↓	)	9	I	Y	i	y	Ê	Õ	Ò	╣	╔	┘	Θ	•
-A	◙	→	*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Ω	·
-B	♂	←	+	;	K	[	k	{	Ì	¢	½	╗	╦	■	δ	√
-C	♀	∟	,	<	L	\	l			Ô	£	¼	╝	╠	■	∞	ⁿ
-D	♪	↔	-	=	M	]	m	}	ì	Ù	¡	╜	═	▌	ø	²
-E	♫	▲	.	>	N	^	n	~	Ã	Pt	«	╛	╬	▐	ε	■
-F	☼	▼	/	?	O	_	o	⌂	Â	Ó	»	┐	╧	▬	∩	

Hex Digits 1st → 2nd ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		►		0	@	P	`	p	Ç	É	¦	▓	└	╨	α	≡
-1	☺	◄	!	1	A	Q	a	q	ü	È	´	▒	┴	╤	β	±
-2	●	↕	"	2	B	R	b	r	é	Ê	ó	▓	┬	╥	Γ	≥
-3	♥	‼	#	3	C	S	c	s	â	ô	ú	│	├	╙	π	≤
-4	♦	¶	$	4	D	T	d	t	Â	Ë	¨	┤	─	╘	Σ	⌠
-5	♣	§	%	5	E	U	e	u	à	Ï	¸	╡	┼	╒	σ	⌡
-6	♠	▬	&	6	F	V	f	v	¶	û	³	╢	╞	╓	μ	÷
-7	•	↨	'	7	G	W	g	w	ç	ú	‑	╖	╟	╫	τ	≈
-8	◘	↑	(	8	H	X	h	x	ê	¤	Î	╕	╚	╪	Φ	°
-9	○	↓	)	9	I	Y	i	y	ë	Ô	┌	╣	╔	┘	Θ	∙
-A	◙	→	*	:	J	Z	j	z	è	Ü	┐	║	╩	┌	Ω	·
-B	♂	←	+	;	K	[	k	{	ï	¢	½	╗	╦	█	δ	√
-C	♀	∟	,	<	L	\	l			î	£	¼	╝	╠	▄	∞	ⁿ
-D	♪	↔	-	=	M	]	m	}	=	Ù	¾	╜	=	█	φ	²
-E	♫	▲	.	>	N	^	n	~	À	Û	«	╛	╬	▀	ε	■
-F	☼	▼	/	?	O	_	o	△	§	ƒ	»	┐	╧	▄	∩	

Hex Digits 1st → 2nd ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		►		0	@	P	`	p	Ç	É	á	▓	└	┴	α	≡
-1	☺	◄	!	1	A	Q	a	q	ü	æ	í	▓	┴	┬	β	±
-2	●	↕	"	2	B	R	b	r	é	Æ	ó	▓	┬	┬	Γ	≥
-3	♥	‼	#	3	C	S	c	s	â	ô	ú	│	├	┴	π	≤
-4	♦	¶	$	4	D	T	d	t	ä	ö	ñ	┤	─	└	Σ	⌠
-5	♣	§	%	5	E	U	e	u	à	ò	Ñ	┤	┼	┌	σ	⌡
-6	♠	▬	&	6	F	V	f	v	å	û	ª	┤	┞	└	µ	÷
-7	•	↨	'	7	G	W	g	w	ç	ú	º	┐	├	┼	τ	≈
-8	◘	↑	(	8	H	X	h	x	ê	ÿ	¿	┐	└	┼	Φ	°
-9	○	↓	)	9	I	Y	i	y	ë	Ö	⌐	┤	┌	┘	Θ	•
-A	◙	→	*	:	J	Z	j	z	è	Ü	¬	│	┴	┌	Ω	·
-B	♂	←	+	;	K	[	k	{	ï	ø	½	┐	┬	█	δ	√
-C	♀	∟	,	<	L	\	l	|	î	£	¼	┘	├	█	∞	ⁿ
-D	♪	↔	-	=	M	]	m	}	ì	Ø	¡	┘	═	█	φ	²
-E	♫	▲	.	>	N	^	n	~	Ä	Pt	«	┘	┼	█	ε	■
-F	☼	▼	/	?	O	_	o	△	Å	ƒ	¤	┐	┴	█	∩	

Appendix D. Allowable Dead Key Combinations

Germany:
áéÉíóú àèìòù

France:
äÄëïöÖüÜÿ âéîôû

Spain:
äÄëïöÖüÜÿ áéÉíóú
àèìòù âêîôû

UK:
dead key not supported

Italy:
dead key not supported

Belgium:
âêûîô äëüïöÿÄÜÖ áéúíóÉ àèùìò ñÑ

Denmark:
éÉáíóù àèìòù âêîôû äÄëïöÖüÜÿ

Norway:
éÉáíóù àèìòù âêîôû äÄëïöÖüÜÿ

Portugal:
áÁéÉíÍóÓúÚ ãÃõÕñÑüÜ àÀèÈìÌòÒùÙ âÂêÊôÔ

Swiss French:
ñÑ âêîôû àèìòù äëïöüÄËÏÖÜÿ éÉáíóú

Swiss German:
ñÑ âêîôû àèìòù äëïöüÄËÏÖÜÿ éÉáíóú

Sweden:
éÉáíóú àèìòù âêîôû äÄëïöÖüÜÿ ñÑ

Finland:
éÉáíóú àèìòù âêîôû äÄëïöÖüÜÿ ñÑ

Canada:
éÉíí àÀèÈùÙ âÂêÊîÎôÔûÛ äÄëËiÏöÖüÜ çÇ

D-4

Appendix E. Keyboard Templates

Introduction

Templates are used to locate character positions on the keyboard. Different characters can appear in different positions, depending on the country language selected with the KEYB command.

From the table of contents on the previous page, select the country language you want to use. Use the templates to select the keys that you want. Function keys located across the top of the keyboard are not shown. Shaded areas indicate keys are not available on some U.S. keyboards.

For keys with three or four characters shown, use the key combinations in the following table to produce the desired upper right and lower right characters. No additional keys are required for lower left characters. Use the shift key for upper left characters.

Country	Lower right character except enhanced keyboard	Lower right character enhanced template	Upper right character all templates
Canada (Fr.)	Alt-Shift keys	Alt-Gr.	None
Denmark	Alt	Alt-Gr.	Alt-Shift keys
Finland	Alt	Alt-Gr.	Alt-Shift keys
Norway	Alt	Alt-Gr.	Alt-Shift keys
Sweden	Alt	Alt-Gr.	Alt-Shift keys
All others	Alt-Ctrl keys	Alt-Gr.	None

Refer to Appendix D for dead key combinations for certain country keyboards. DOS 3.30 allows you to change the keyboard using the KEYB command. For additional information, see the KEYB command in Chapter 7.
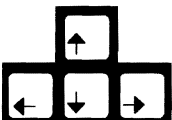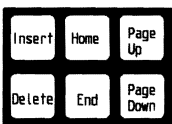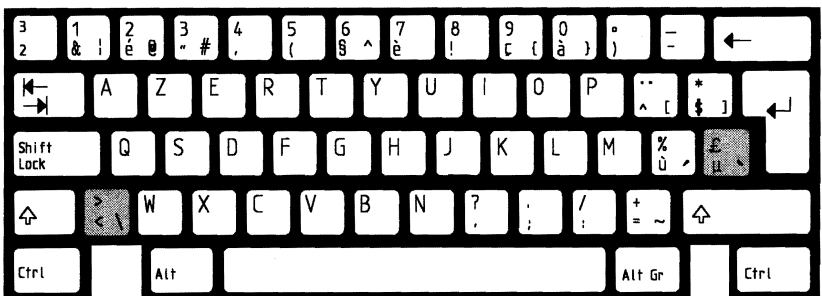
Belgium XT
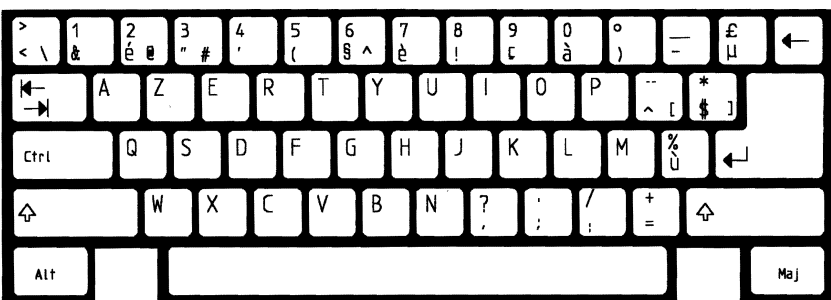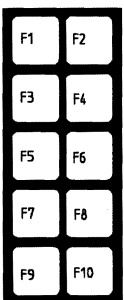
F1	F2
F3	F4
F5	F6
F7	F8
F9	F10
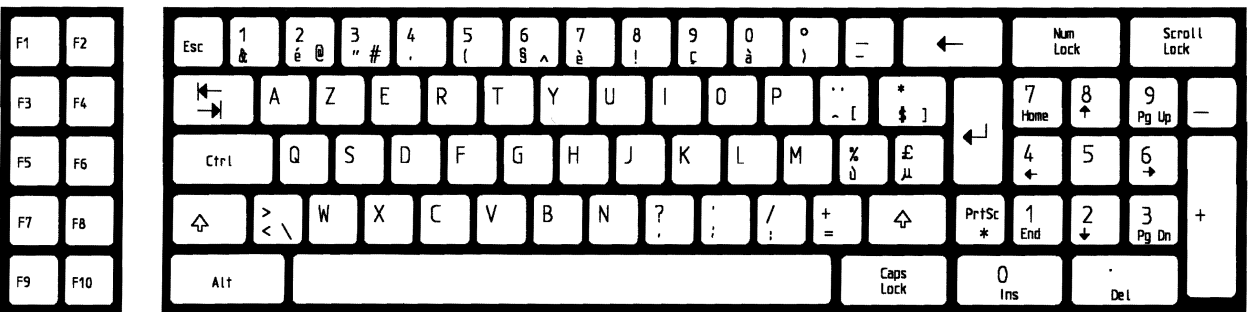
Belgium Convertible
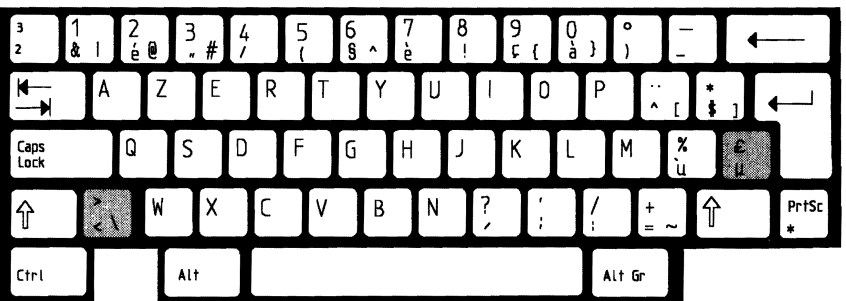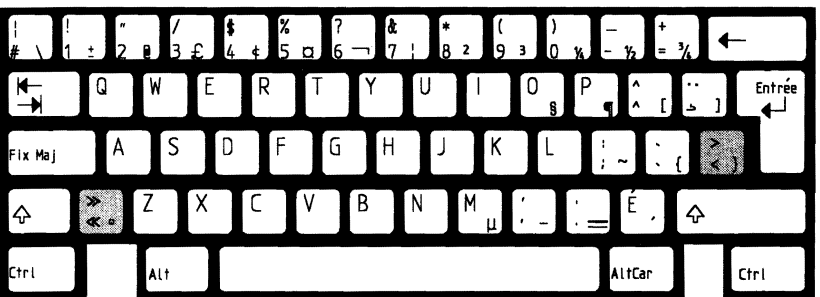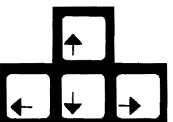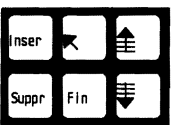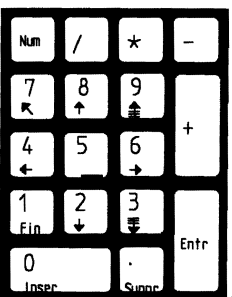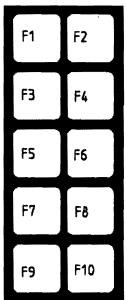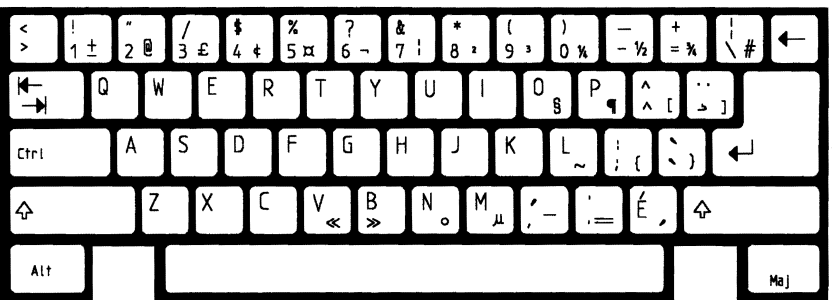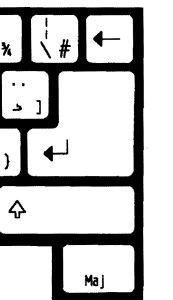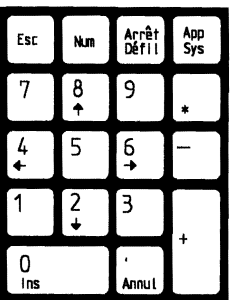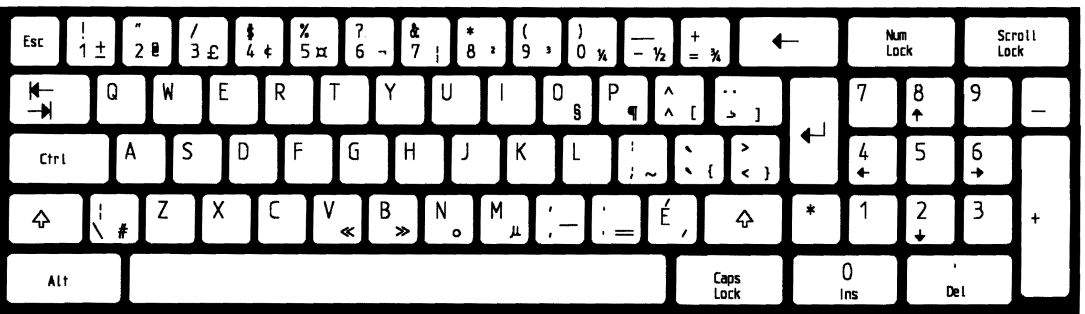
Canada XT

Canada Convertible
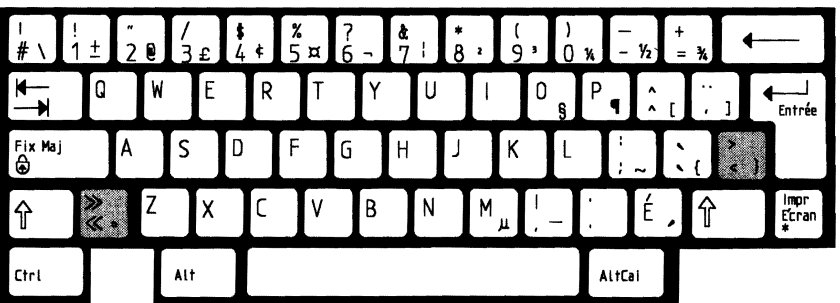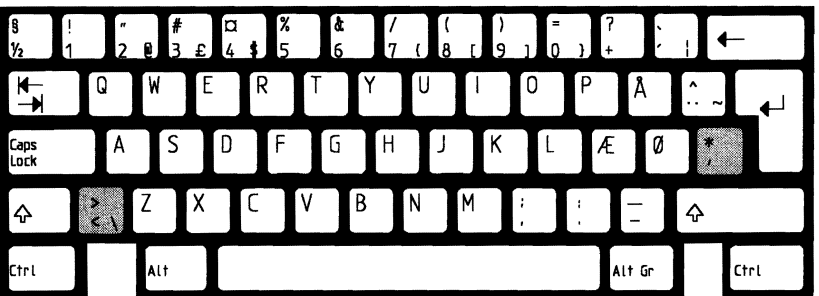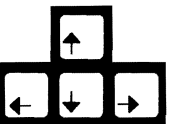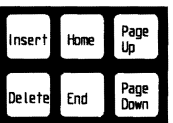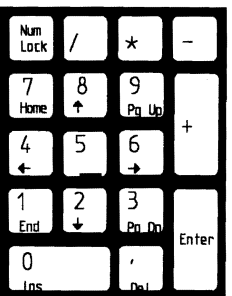
KEYBOARD TEMPLATES
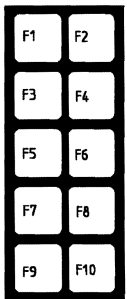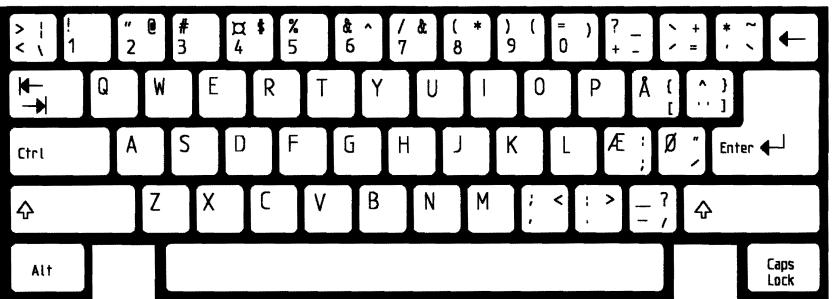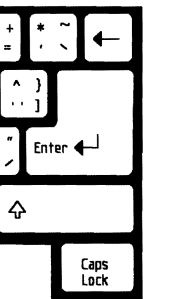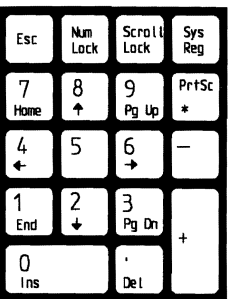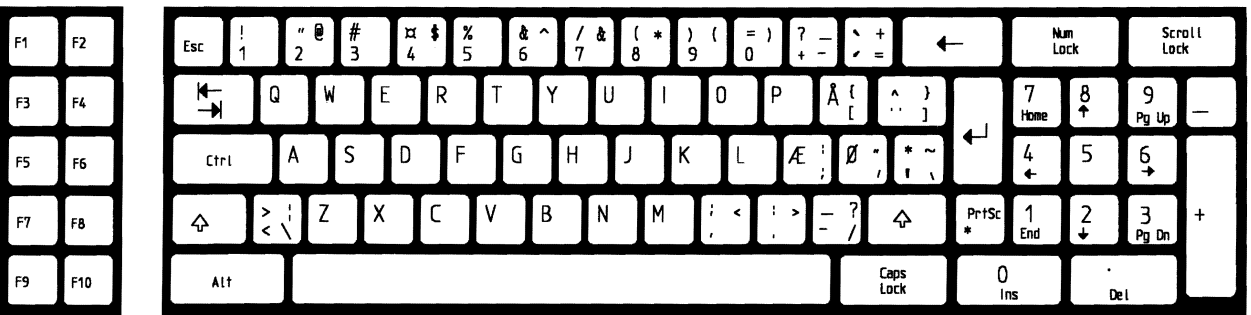
Denmark XT

Denmark Convertible

France XT

Esc 1 & | 2 é @ | 3 " # | 4 ' | 5 (| 6 § ^ | 7 è | 8 ! | 9 ç | 0 à | °) | — | ← | Num Lock | Scroll Lock

↹ | A | Z | E | R | T | Y | U | I | O | P | ¨ ^ [| * $] | ↵ | 7 Home | 8 ↑ | 9 Pg Up | —

Ctrl | Q | S | D | F | G | H | J | K | L | M | % ù | £ µ | 4 ← | 5 | 6 →

⇧ | > < \ | W | X | C | V | B | N | ? , | ; . | / : | + = | ⇧ | PrtSc * | 1 End | 2 ↓ | 3 Pg Dn | +

Alt | | Caps Lock | 0 Ins | . Del

F1 | F2
F3 | F4
F5 | F6
F7 | F8
F9 | F10

France Convertible

² | 1 & | 2 é ~ | 3 " # | 4 ' { | 5 ([| 6 - | | 7 è ` | 8 _ \ | 9 ç ^ | 0 à @ | °) | + = } | ←

↹ | A | Z | E | R | T | Y | U | I | O | P | ¨ ^ | £ $ ¤ | ↵

🔒 | Q | S | D | F | G | H | J | K | L | M | % ù | µ

⇧ | | W | X | C | V | B | N | ? , | ; . | / : | § ! | ⇧ | Impr écran *

Ctrl | Alt | | Alt Gr
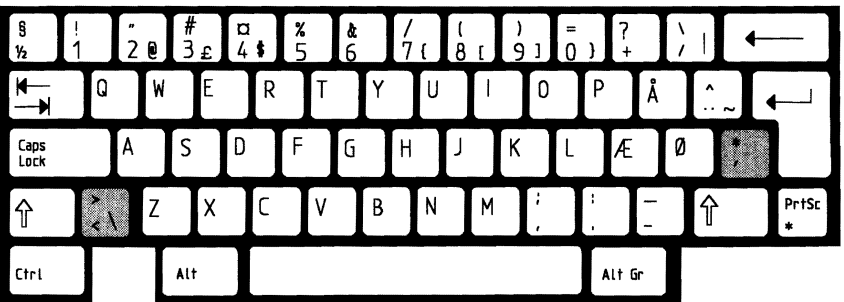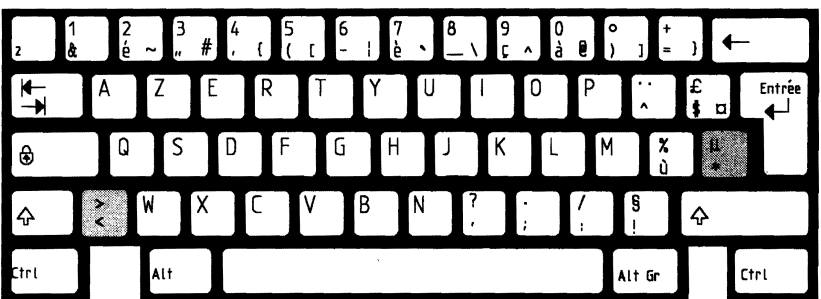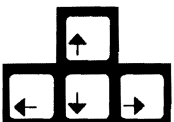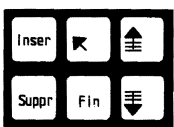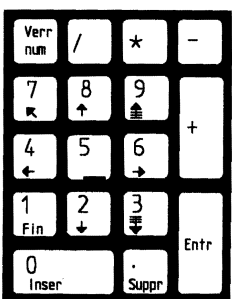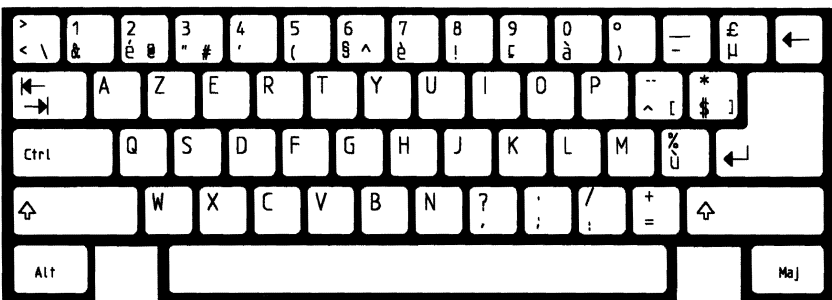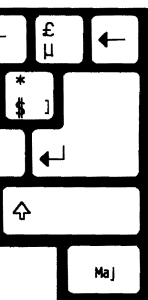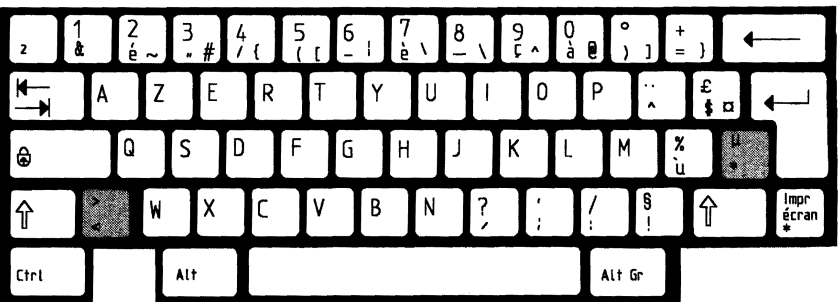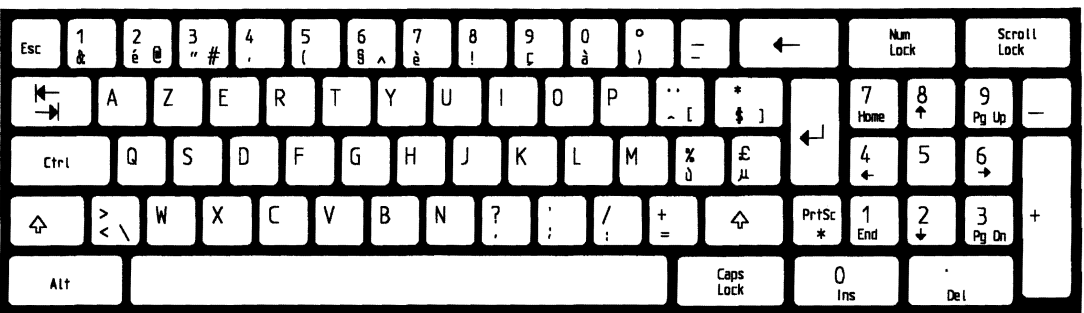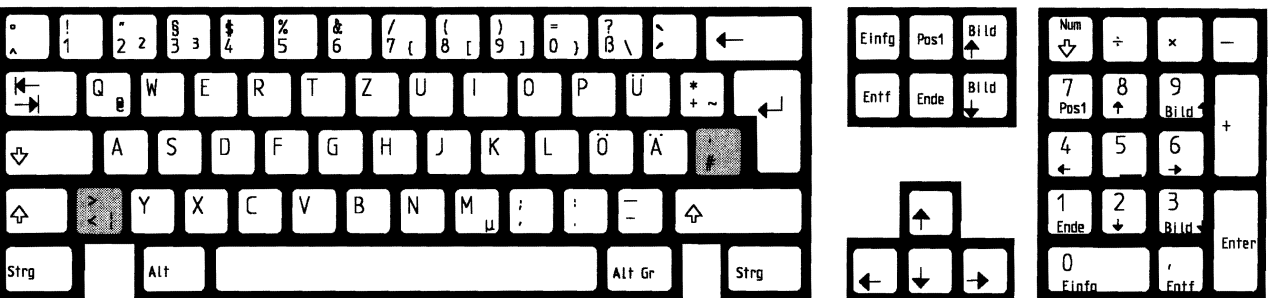
German Enhanced PC

German AT
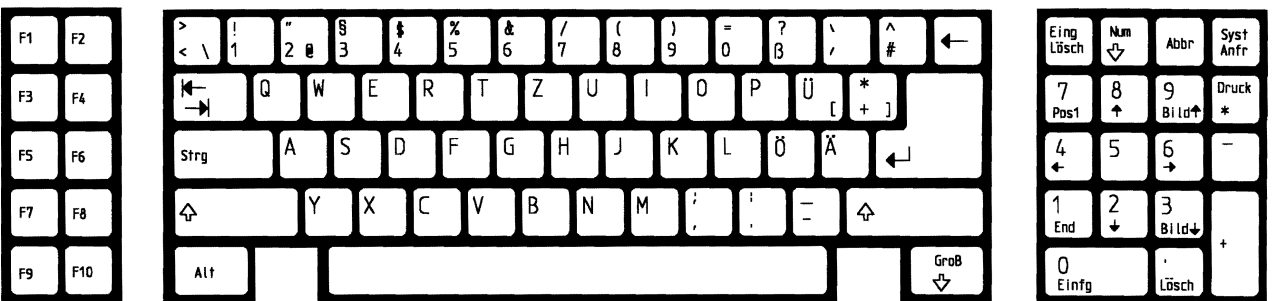
German XT

German Convertible

KEYBOARD TEMPLATES

Italy XT

Esc ! 1 " 2 £ 3 $ 4 % 5 & 6 / 7 (8) 9 = 0 ? , ^ ì ← Num Lock Scroll Lock

F1 F2 F3 F4 F5 F6 F7 F8 F9 F10

Q W E R T Y U I O P é è [* +] ↵ 7 Home 8 ↑ 9 Pg Up −

Ctrl A S D F G H J K L @ ò # à § ù 4 ← 5 6 →

⇧ > < \ Z X C V B N M ; , : . _ - ⇧ PrtSc * 1 End 2 ↓ 3 Pg Dn +

Alt Caps Lock 0 Ins . Del
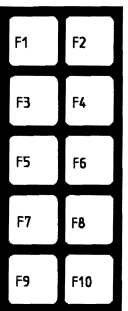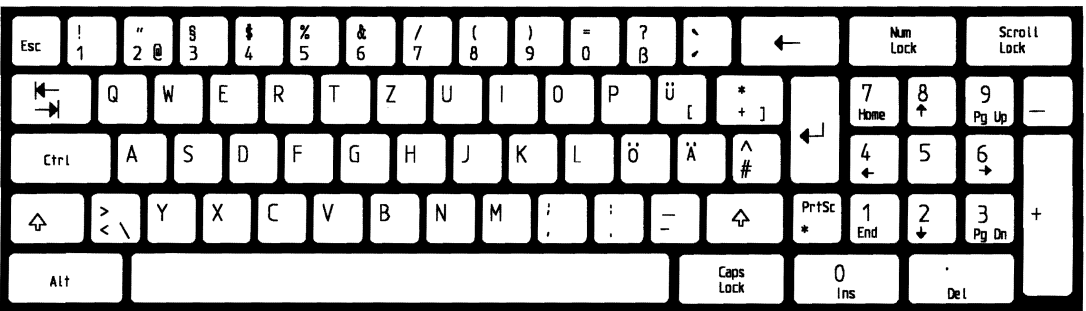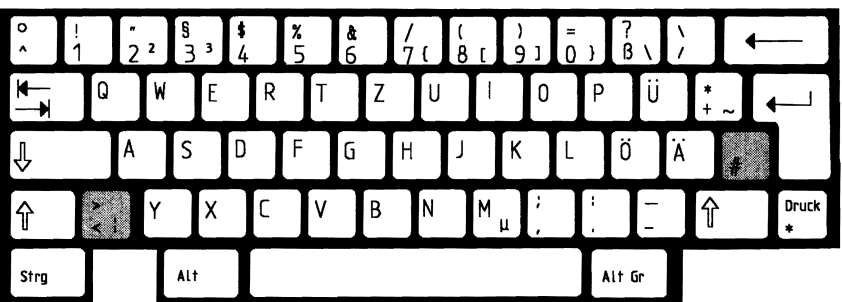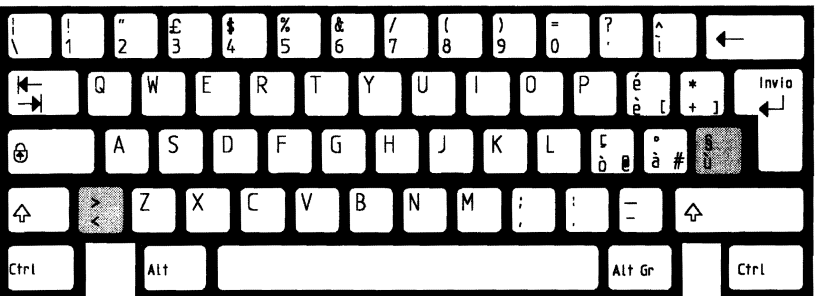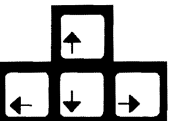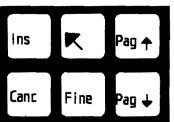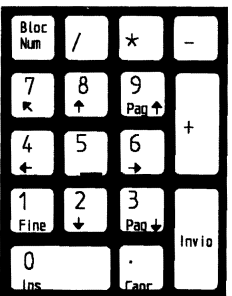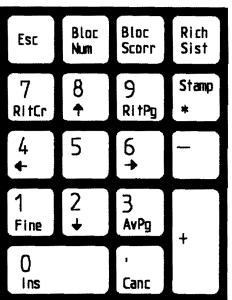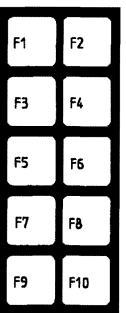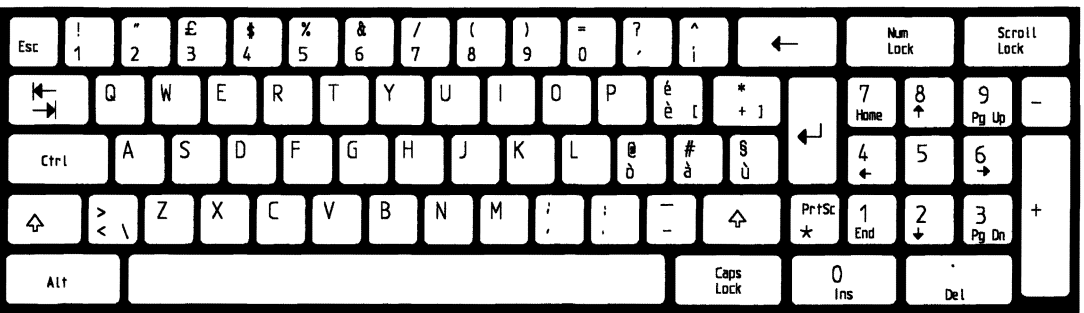
Italy Convertible

! \ ! 1 " 2 £ 3 $ 4 % 5 & 6 / 7 (8) 9 = 0 ? , ^ ì ←

↹ Q W E R T Z U I O P é è [* +] ↵

Caps Lock A S D F G H J K L ç ò @ ° à # ù §

⇧ > < Y X C V B N M ; , : . _ - ⇧ PrtSc *

Ctrl Alt Alt Gr

KEYBOARD TEMPLATES
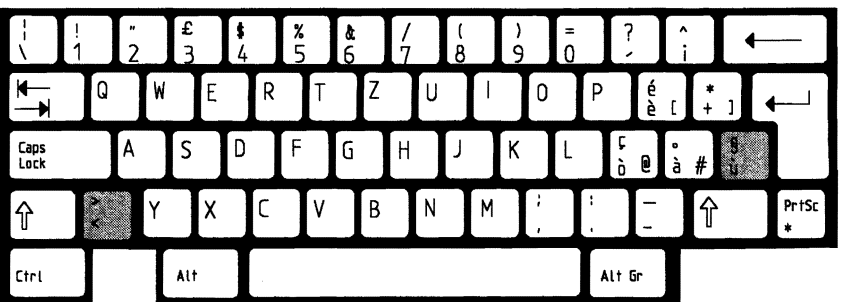
Latin America Enhanced PC
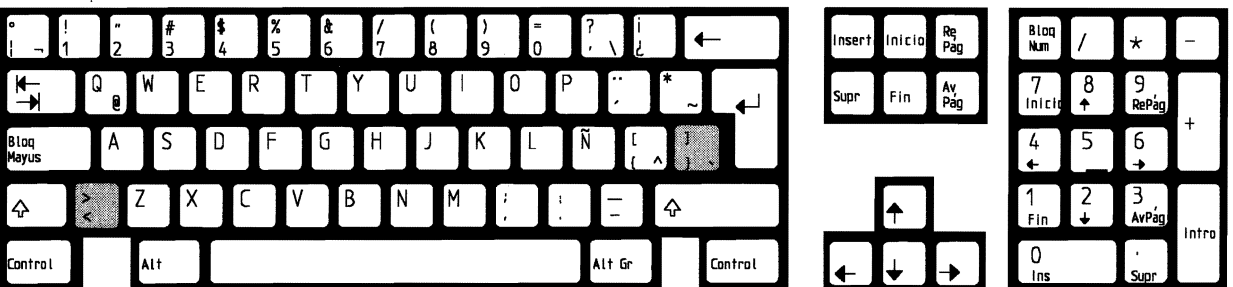
Latin America AT
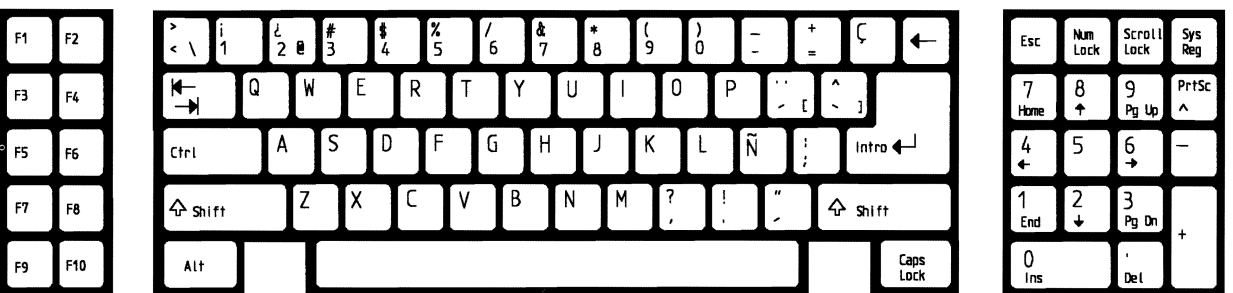
Latin America XT
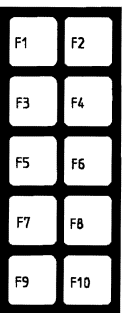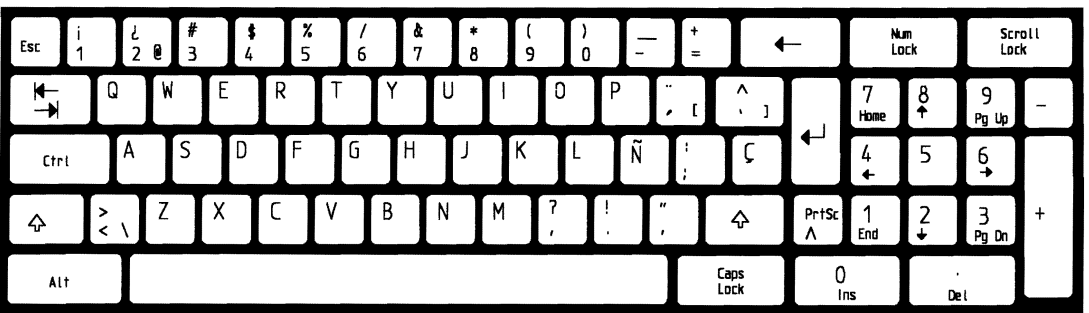
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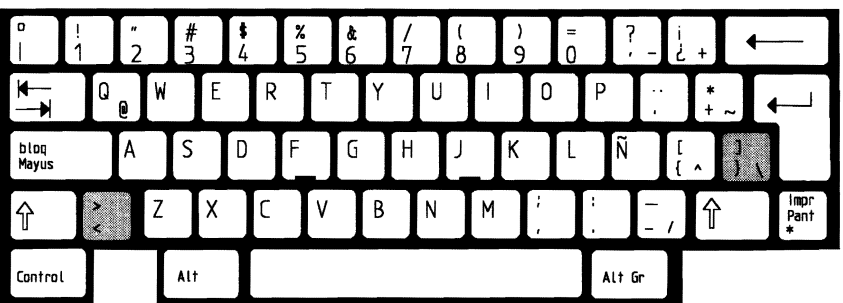
Netherlands Convertible
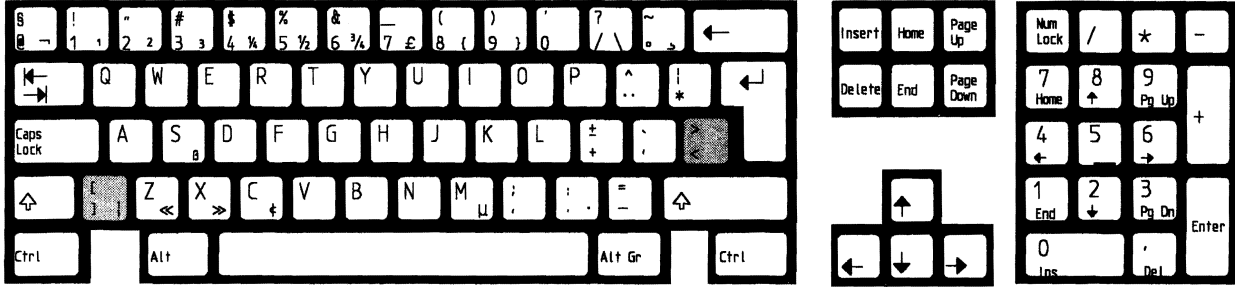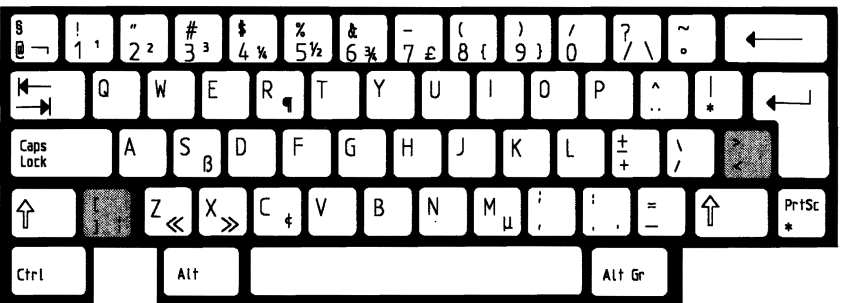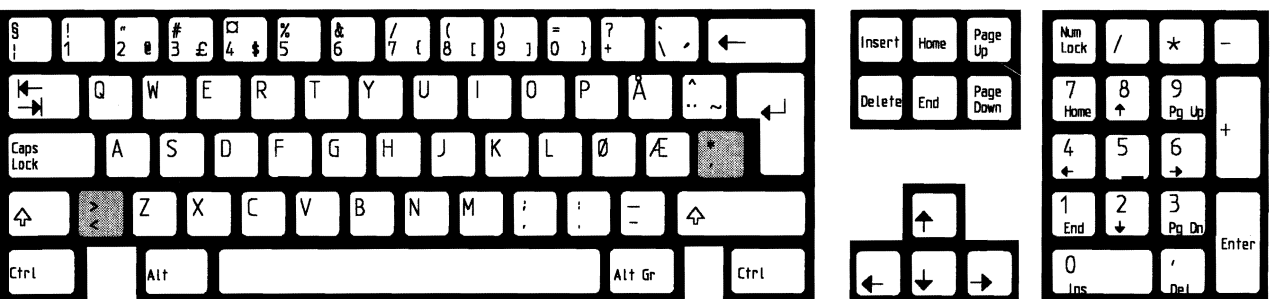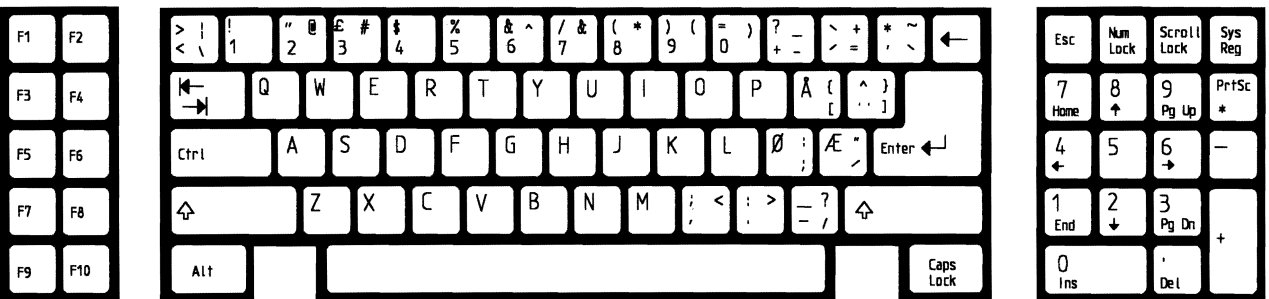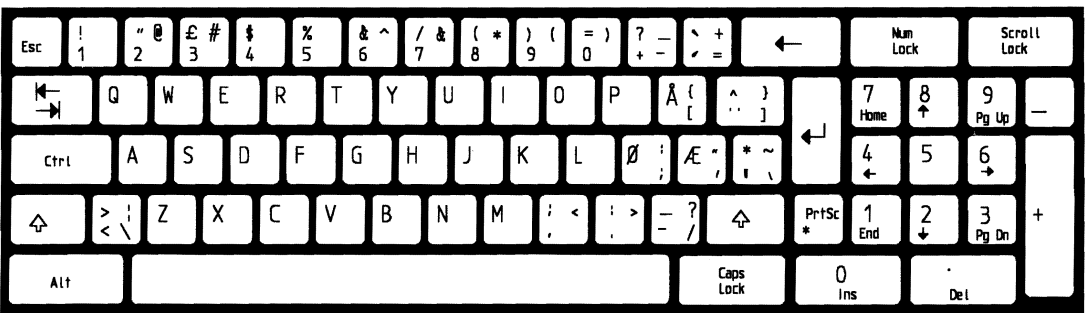
Norway XT

Norway Convertible
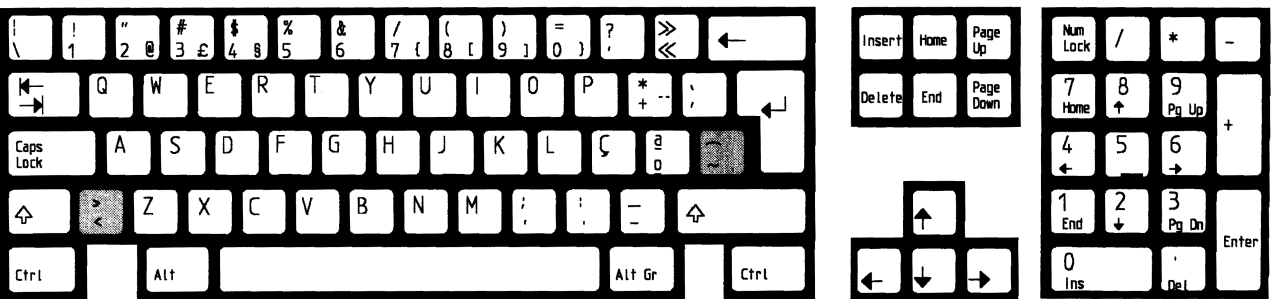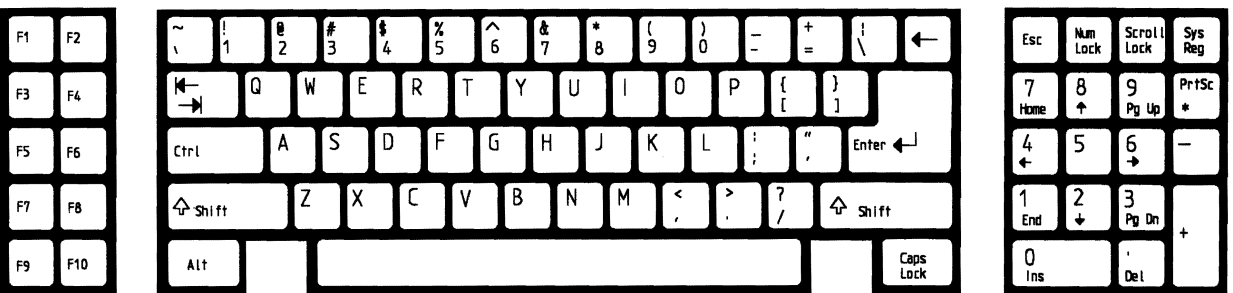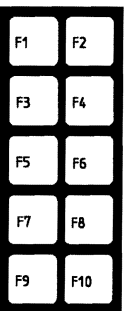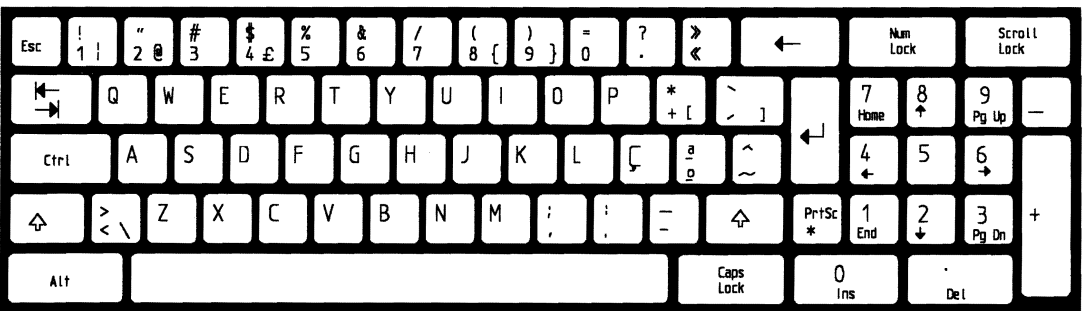
Portugal XT

Portugal Convertible
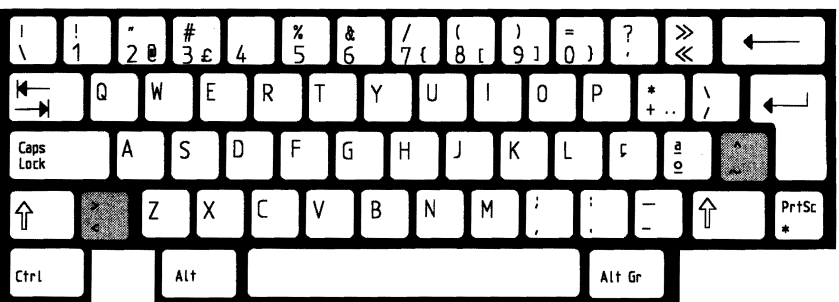
KEYBOARD TEMPLATES
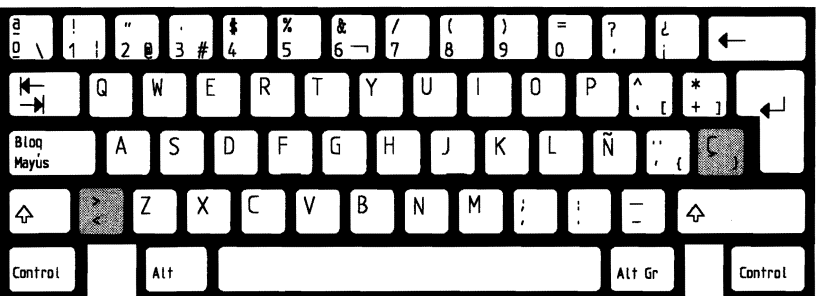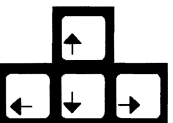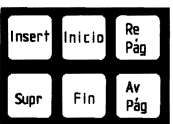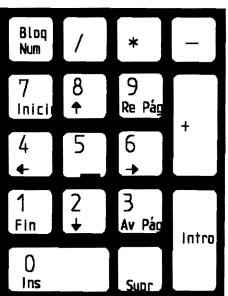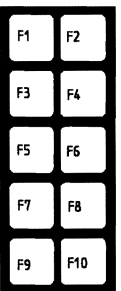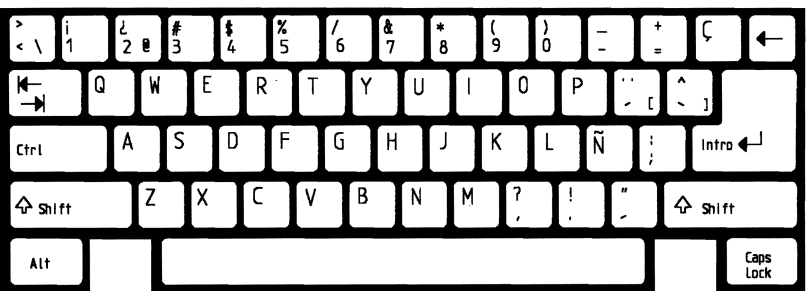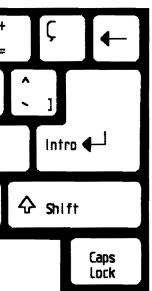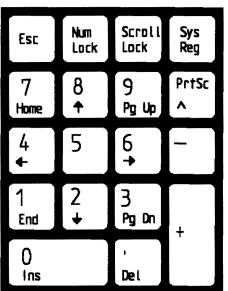
Spain XT
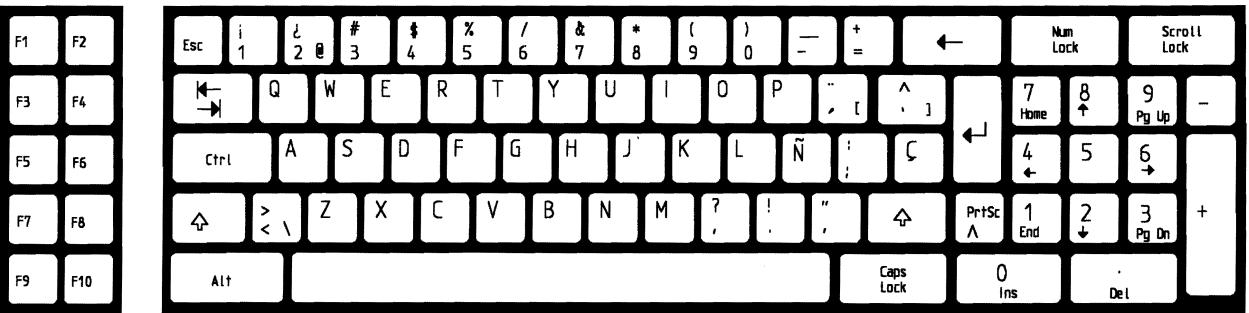
Spain Convertible
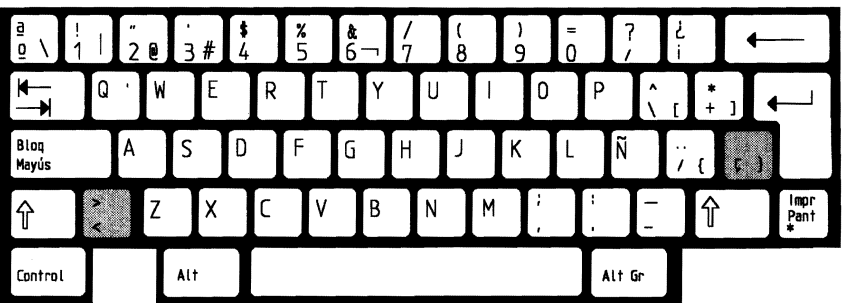
KEYBOARD TEMPLATES

Sweden/Finland Enhanced PC
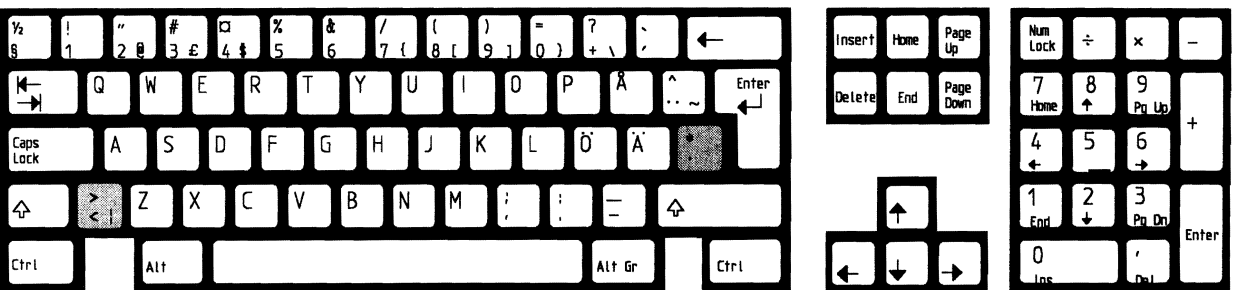
Sweden/Finland AT
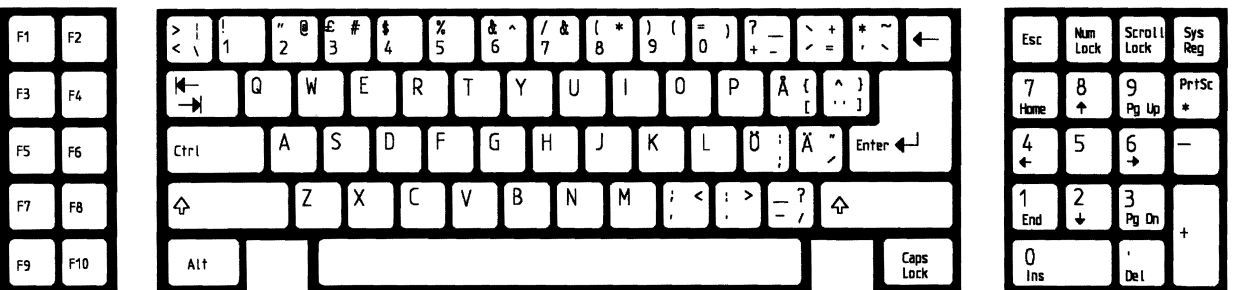
Sweden/Finland XT
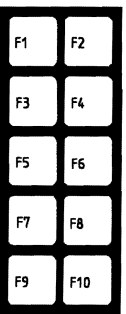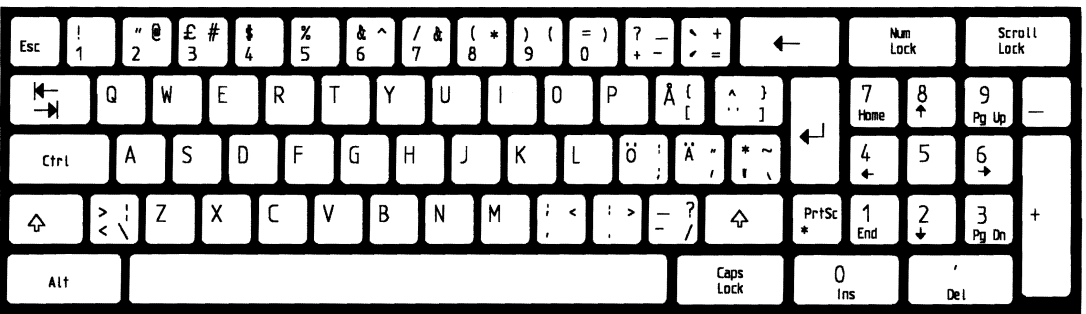
Sweden/Finland Convertible

KEYBOARD TEMPLATES

Enhanced PC keyboard

Row 1: ° § | + 1 ¦ | " 2 @ | * 3 # | ç 4 | % 5 | & 6 | / 7 | (8 |) 9 | = 0 | ? ' | ^ ~ | ←

Row 2: ⇤⇥ | Q | W | E | R | T | Z | U | I | O | P | è ü ö | ! .. | ↵

Row 3: Caps Lock | A | S | D | F | G | H | J | K | L | é ö ä è | à ä | £ |

Row 4: ⇧ | > < | Y | X | C | V | B | N | M | ; , | : . | — _ | ⇧

Row 5: Ctrl | Alt | | Alt Gr | Ctrl

Insert | Home | Page Up
Delete | End | Page Down

↑
← ↓ →

Num Lock | / | * | −
7 Home | 8 ↑ | 9 Pg Up
4 ← | 5 | 6 → | +
1 End | 2 | 3 Pg Dn
0 Ins | . Del | Enter

AT keyboard

F1 F2
F3 F4
F5 F6
F7 F8
F9 F10

Row 1: > < \ | + 1 | " 2 @ | * 3 # | ç 4 ○ | % 5 § | & 6 | / 7 ¦ | (8 |) 9 | = 0 | ? ' , | ^ ~ | £ $ | ←

Row 2: ⇤⇥ | Q | W | E | R | T | Z | U | I | O | P | è ü ö | ! ..]

Row 3: Ctrl | A | S | D | F | G | H | J | K | L | é ö ä è | à ä | Enter ↵

Row 4: ⇧ | Y | X | C | V | B | N | M | ; , | : . | — _ | ⇧

Row 5: Alt | | Caps Lock

Esc | Num Lock | Scroll Lock | Sys Req
7 Home | 8 ↑ | 9 Pg Up | PrtSc *
4 ← | 5 | 6 → | −
1 End | 2 ↓ | 3 Pg Dn | +
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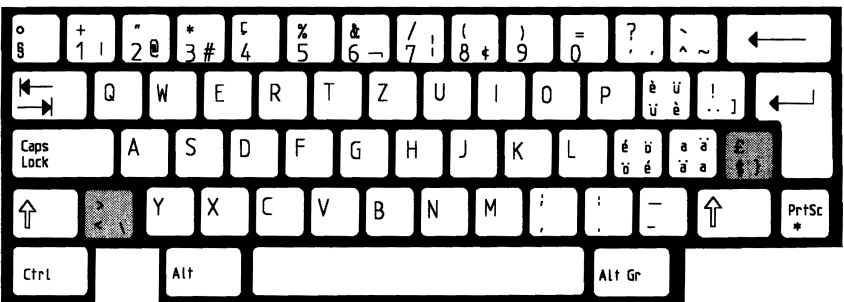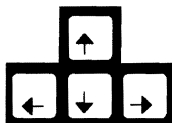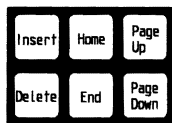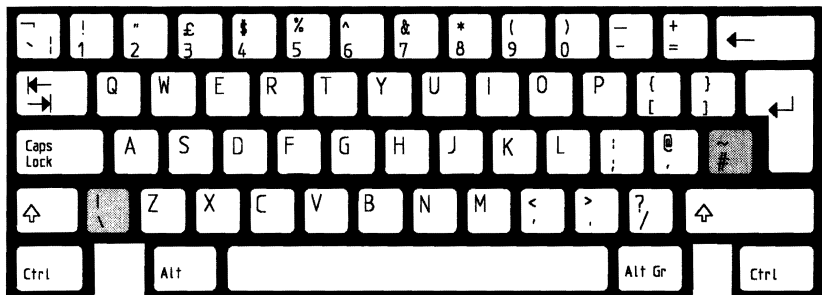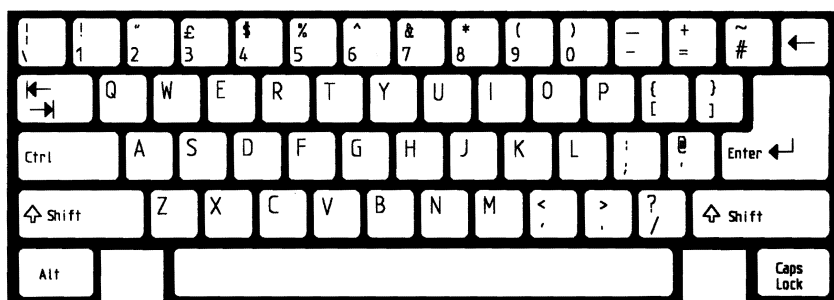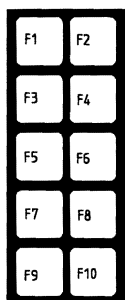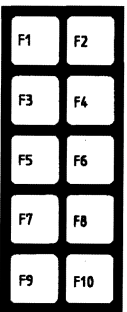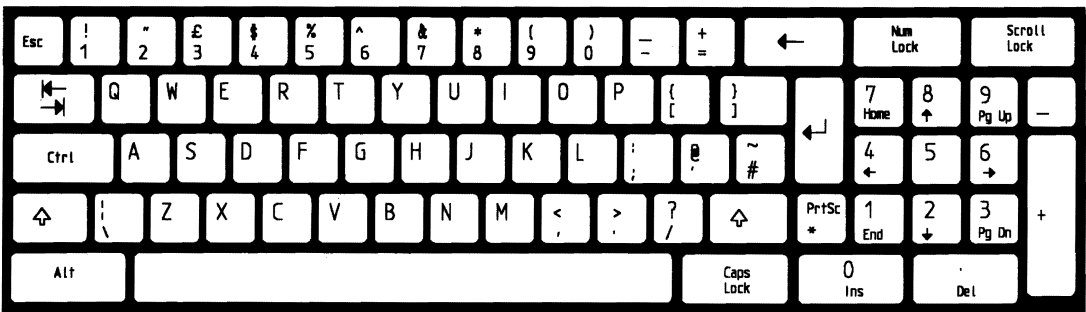
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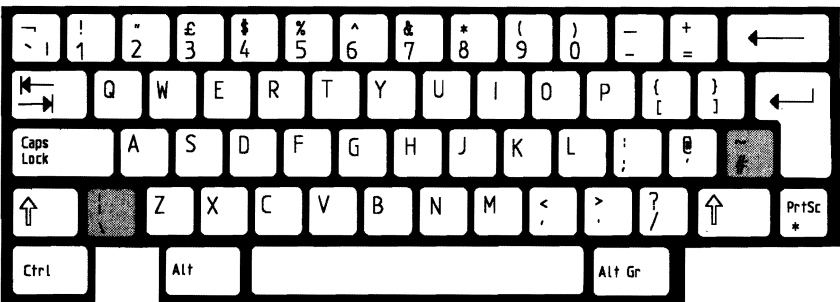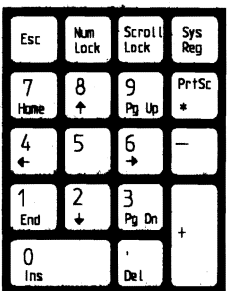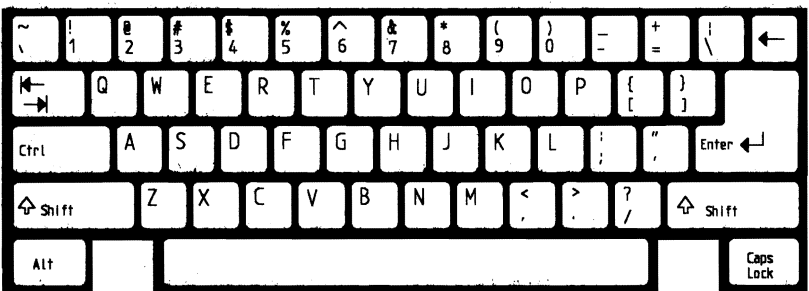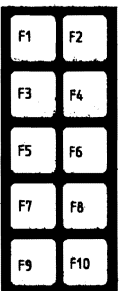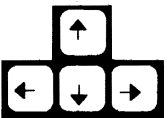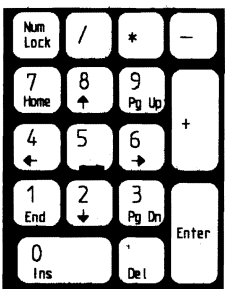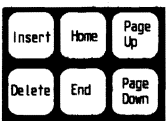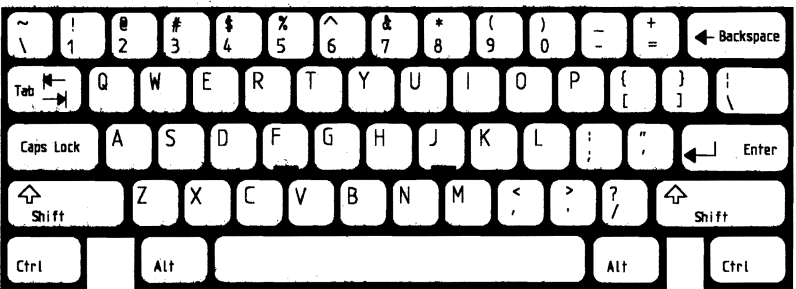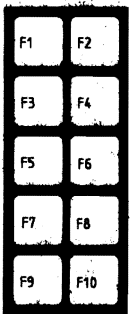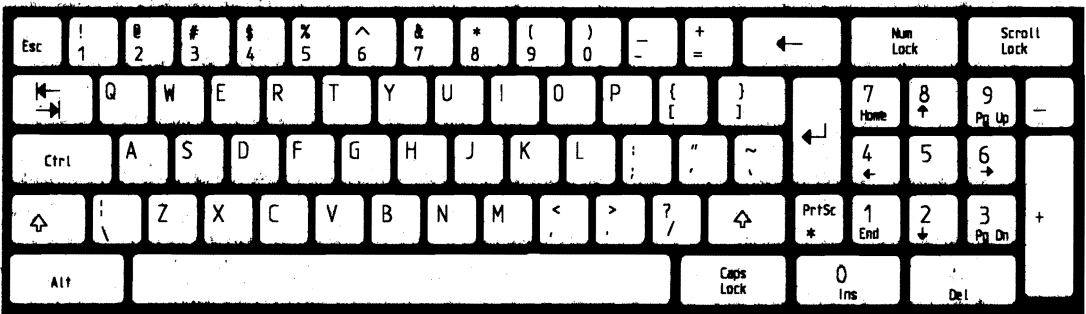
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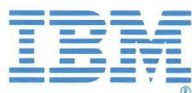
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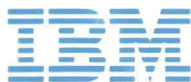## Programming Family

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